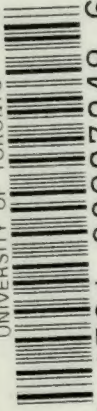


UNIVERSITY OF TORONTO



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**ICONES PLANTARUM FORMOSANARUM**

**NEC NON ET**

**CONTRIBUTIONES AD FLORAM  
FORMOSANAM**

**VIII**

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**AUCTORE**

**Bunzō Hayata**

QK

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H3

v. 8-9



TO HIS EXCELLENCY MOTOJIRO AKASHI,

GOVERNOR GENERAL OF FORMOSA.

SIR,

I have the honour to submit to your Excellency the eighth volume of the *Icones Plantarum Formosanarum, nec non et Contributiones ad Floram Formosanam* by BUNZŌ HAYATA, D. Sc.

HIROSHI SHIMOMURA,

CIVIL GOVERNOR OF FORMOSA.

November 1, 1918, Taihoku.





## INTRODUCTION

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The present volume contains studies on species and varieties ranging from the Berberideæ down to the Polypodiaceæ. All the species of Phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER; while those of vascular cryptogams are arranged after the system of ENGLER and PRANTL. Of the species and varieties mentioned in this work, 111 are proposed as new species and 17 are regarded as new varieties of known species. No new genus is proposed, but 4 genera are mentioned as new to the flora of the island. The latter genera are as follows:—

<i>Clematoclethra</i>	<i>Stranvaesia</i>
<i>Sphaeranthus</i>	<i>Hieracium</i>

Thus, up to the present date, the total number of species of the flora, so far as is known, is 3458 species and 74 varieties belonging to 1174 genera and 169 families.

Finally, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa, to whom I am much indebted for help in the collection of material and in the publication of this work.

B. HAYATA.

October 1918, Taihoku and Tōkyō.

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## CONTENTS.

[illegible]





## Contributions to the Flora of Formosa.

## VI.

## Berberideæ.

*Stauntonia* DC.

***Stauntonia formosana*** HAYATA sp. nov. (Pl. I.)=*Holboellia formosana*  
 Scandentissima et volubilis, rami et ramuli teretes. Folia ad apicem ramuli  
 annotini disposita digitatim 4-foliolata, petiolis communibus 5 cm. longis graci-  
 libus, petiolulis  $1\frac{1}{2}$  cm. longis; foliolis subæqualibus, centralibus plus minus  
 majoribus oblanceolatis vel obovato-oblongis 7 cm. longis  $2\frac{1}{2}$  cm. latis apice  
 triangulari-acutis basi cuneatis margine integris subtus pallidissimis pinninerviis.  
 Racemi ad basin ramuli hornotini dispositi 7 cm. longi gracillimi, bracteis  
 minutis linearibus 4 mm. longis  $\frac{1}{2}$  mm. latis acuminatis glabris, pedicellis gra-  
 cillimis  $1-1\frac{1}{2}$  cm. longis glabris. Fl. ♂ : sepala 3 ovato-lanceolata 11 mm.  
 longa  $3\frac{1}{2}$  mm. lata apice obtusa basi contracta; petala 3 linearia 11 mm. longa  
 $\frac{1}{2}-\frac{2}{3}$  mm. lata apice obtusa basi contracta minute muricata; columna staminalis  
 4-5 mm. longa, filamentis subliberis basi connatis  $1\frac{1}{2}-2$  mm. longis glabris,  
 antheris distinctis linearibus  $2-2\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice obtusis, appen-  
 diculis nullis. Fl. ♀ : sepala 3 ovato-lanceolata 1 cm. longa  $3\frac{1}{2}$  mm. lata  
 apice obtusa basi contracta; petala linearia 1 cm. longa  $\frac{1}{2}$  mm. lata apice obtusa  
 facie apiceque minute muricata basi contracta; carpella 3 cylindrica 3 mm.  
 longa apice perfecte truncata stigmatifera.

HAB. Keitao, leg. B. HAYATA, Aprili. 1916.

Resembles to some extent *S. chinensis* DC.; but greatly differs from it by  
 the nearly distinct stamens with no apical appendage. The new species is a  
 just intermediate form connecting *Stauntonia* and *Holboellia*. It is closely re-  
 lated to *Holboellia* in the free stamens on one hand, while on the other it  
 resembles *Stauntonia* in the acuminate linear sepals.

Note: Flowers pale-green to cream-yellow.

***Stauntonia keitaoensis* HAYATA** sp. nov. (Fig. 1) Scandentissima, rami et ramuli teretes glabri. Folia ad apicem ramuli annotini approximativum 2-3-disposita digitatim 6-foliolata, petiolis communibus 12 cm. longis glabris

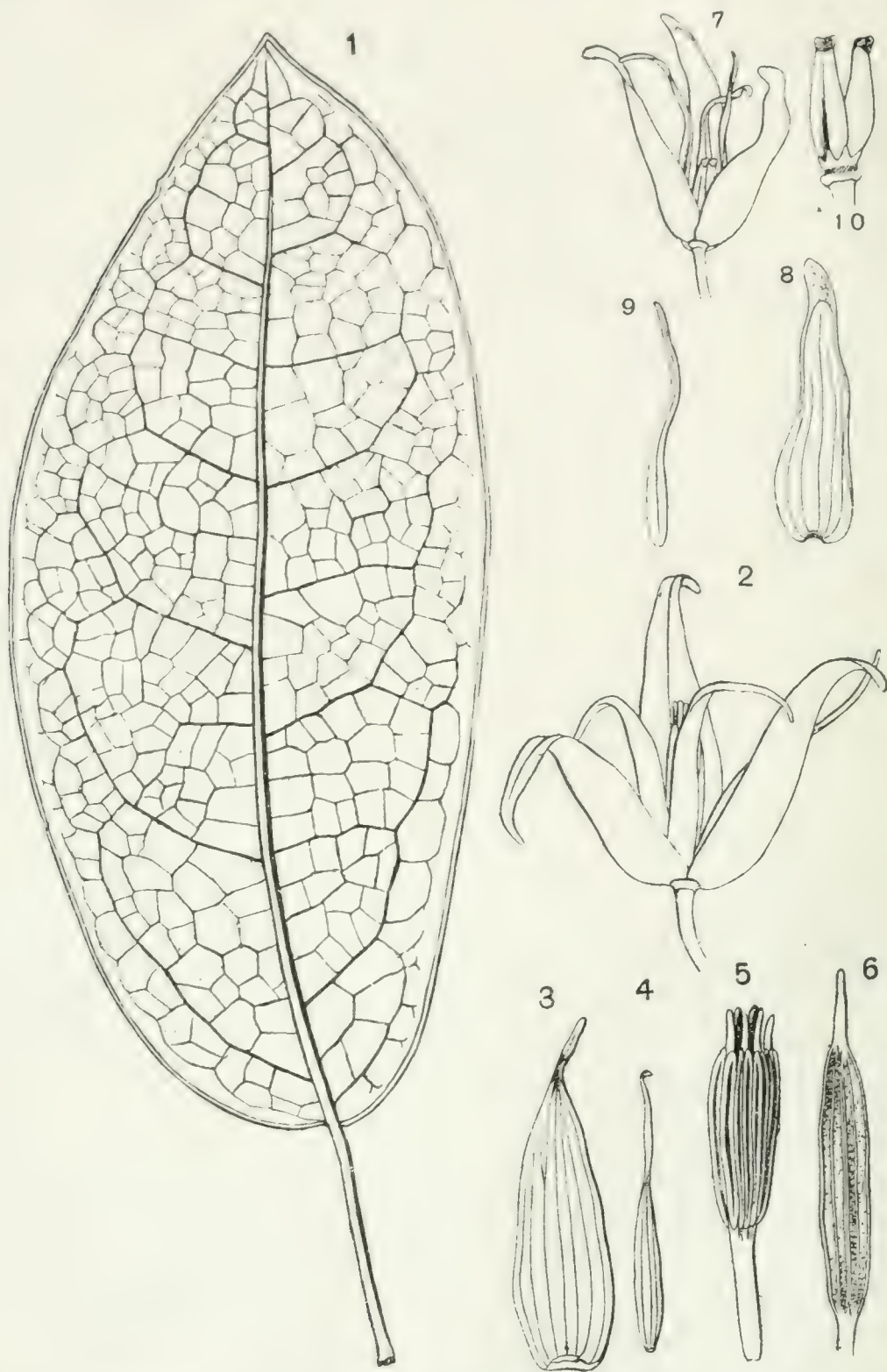


Fig. 1; *Stauntonia keitaoensis* HAYATA; 1, a leaflet; 2, a male flower; 3, a sepal; 4, a petal; 5, staminal column; 6, a stamen; 7, a female flower; 8, a sepal; 9, a petal; 10, ovary.

basi plus minus incrassatis gracilibus, petiolulis  $2\frac{1}{2}$  cm. longis; foliolis centralibus majoribus ovato-oblongis plus minus obliquis 12 cm. longis  $5\frac{1}{2}$  cm. latis apice abrupte acutis vel cuspidatis ad summum arista callosa instructis basi obtusissimis vel rotundatis margine integris utraque glabris subtus glaucis, venis venulisque supra impressis subtus elevatis; foliolis lateralibus basilaribusque minoribus obliquissimis dimidium folioli centralis in longitudine æquantibus. Racemi ad basin ramuli hornotini ad axillas cataphyllarum dispositi, cataphyllis spathulatis 2 cm. longis 5–8 mm. latis apice rotundatis basi attenuatis; racemi pauce ramosi graciles glabri, bracteis linearibus 5–6 mm. longis, pedicellis 1 cm. longis. Fl. ♂: sepala 3 ovato-lanceolata 2 cm. longa 7 mm. lata apice obtusa basi plus minus contracta; petala 3 anguste linearia 2 cm. longa  $1\frac{1}{2}$  mm. lata apice obtusa basi obtusa; columna staminalis 10 mm. longa 2 mm. lata, filamentis toto connatis 3 mm. longis glabris, antheris connatis linearibus 4 mm. longis 1 mm. latis apice appendiculatis, appendiculis linearibus 2 mm. longis acuminatis liberis; rudimentum carpellorum 3 lineari-acuminatum  $1\frac{1}{2}$  mm. longum. Fl. ♀: sepala ovato-oblonga 12 mm. longa 4 mm. lata apice obtusissima basi contracta; petala linearia 11 mm. longa 1 mm. lata apice acuta; carpella 3 lineari-cylindrica 3–4 mm. longa glabra apice stigmatifera.

HAB. inter Keitao et Goshōrin, leg. B. HAYATA, Aprili. 1916.

Near *Stauntonia hexaphylla* DECNE.; but differs from it in having leaves glaucous on the under side.

NOTE: Flowers cream-yellow to white; flower-buds green; ovary green.

***Stauntonia hebandra*** HAYATA sp. nov. (Fig. 2). Scandentissima, rami et ramuli teretes cinerascetes. Folia ad basin ramuli annotini 2–3-disposita digitatim?5-foliolata, petiolis communibus 8–9 cm. longis glabris gracilibus; foliolis centralibus majoribus ellipticis 9 cm. longis  $5\frac{1}{2}$  cm. latis apice rotundatis vel tenuissime emarginatis basi rotundatis margine integris supra glabris subtus pallidissimis plus minus glaucescentibus tenuiter coriaceis; petiolulis  $2\frac{1}{2}$  cm. longis; foliolis lateralibus vel basilaribus plus minus minoribus obscure trinerviis. Racemi e basi ramuli hornotini oriundi 4–5 cm. longi gracillimi glabri, bracteis minutis vel obsoletis, pedicellis gracillimis 4–5 mm. longis. Fl. ♂: sepala 3 ovato-lanceolata 1 cm. longa  $3\frac{1}{2}$  mm. lata apice obtusa basi contracta; petala linearia 9 mm. longa  $\frac{1}{2}$  mm. lata apice obtusissima; stami-



nalis columna 4 mm. longa  $1\frac{1}{2}$  mm. lata, filamentis toto connatis 2 mm. longis

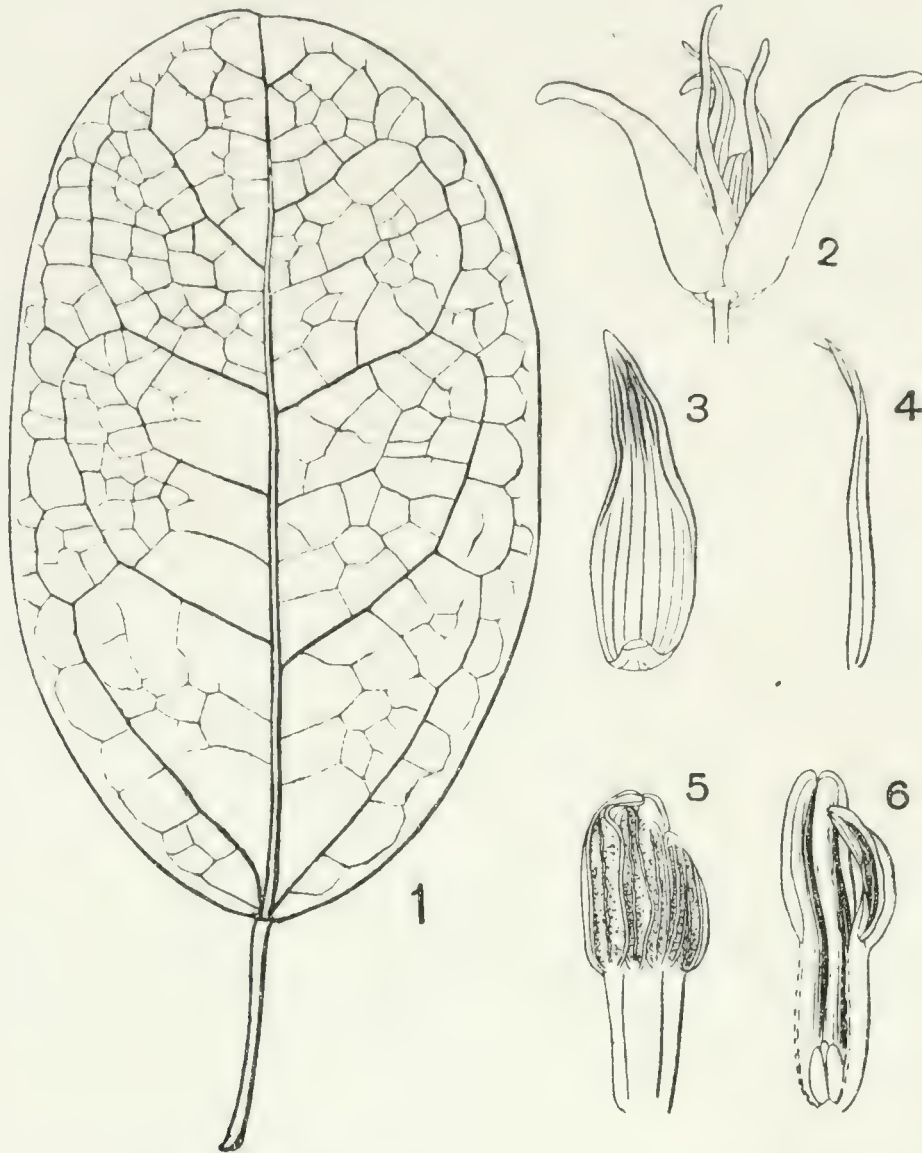


Fig. 2; *Stauntonia hebandra* HAYATA; 1, a leaf; 2, a male flower; 3, a sepal; 4, a petal; 5, staminal column; 6, the same in vertical section, rudimental ovary seen.

glabris, antheris connatis vel subliberis linearibus vel oblongis  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice obtusissimis vel interdum emarginatis, appendiculis nullis; rudimenta carpellorum minuta  $3\frac{1}{2}$  mm. longa linearia. Fl. ♀: ignoti.

HAB. Karapin et Funkiko, leg. B. HAYATA, 1912 Mart.

Near *Stauntonia obovatifoliola* HEMSL. in the leaves; but differs from it in having quite obtuse or

even emarginate anthers.

***Stauntonia obovatifoliola* HAYATA sp. nov.** (Fig. 3, 1-6). Scandentissima et volubilis, rami et ramuli teretes. Folia ad ramulos hornotinos longissimos alternatim remoteque disposita digitatim 3-5-foliolata, petiolis communibus 3 cm. longis basi incrassatis; petiolulis centralibus  $1\frac{1}{2}$  cm. longis, lateralibus brevioribus 1 cm. longis; foliolis centralibus majoribus obovatis 6 cm. longis 4 cm. latis apice subito breve caudatis, (cauda 3-5 mm. longa apice obtusissima sed ad centrum breve aristata vel mucronata), basi obtusissimis vel rotundatis margine

integris obscure trinerviis, venis venulisque supra tenuiter elevatis subtus prominente elevatis supra nitidis subtus pallidis sed haud glaucis. Racemi ad basin ramuli hornotini vel ad axillas foliorum hornotinorum dispositi. Fl. ♀: sepala 3 ovato-lanceolata 2 cm. longa 7 mm. lata apice obtusa basi plus minus contracta; petala 3 lineari-lanceolata 18 mm. longa 3 mm. lata; carpella 3 cylindrica plus minus interiore recurva 3 mm. longa, stigmatibus sessilibus oblongis 1 mm. longis facie ventrali profunde sulcatis.

HAB. Nantō: Kwannondaki, leg. S. FUJII, Mart. 1913.

Differs from *S. hexaphylla* DECNE by the obovate or oblanceolate leaves, usually with a cuspidate tip.

NOTE: Sepals pale cream-green outside, but reddish inside.

***Stauntonia obovatifoliola*** HAYATA var. ***pinninervis*** HAYATA n. v. (Fig. 3, 7-13). Foliola obovato-oblonga apice breve caudata (cauda apice obtusa mucronata) basi truncata vel rotundata margine integra 7-8 cm. longa  $2\frac{1}{2}$ -3 cm. lata, venis venulisque supra tenuiter elevatis subtus prominente

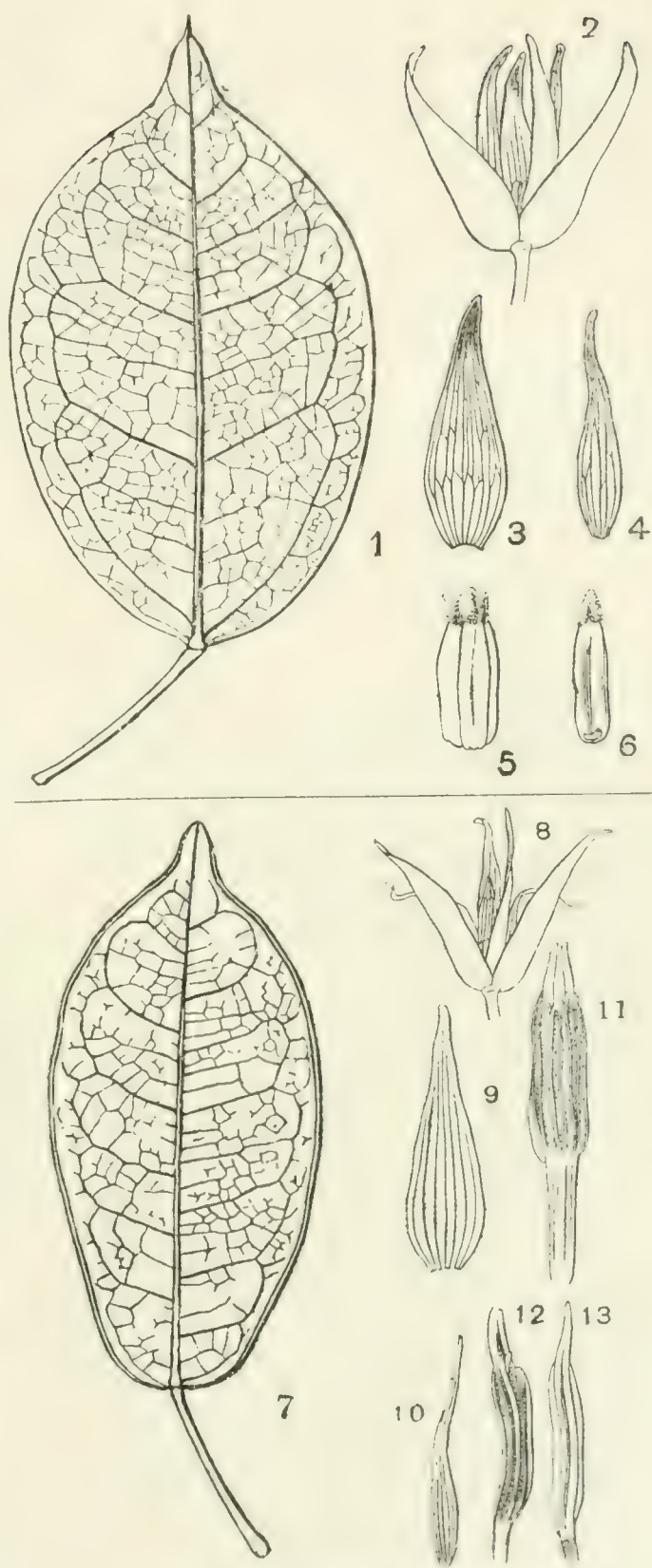


Fig. 3; *Stauntonia obovatifoliola* HAYATA; 1, a leaflet; 2, a female flower; 3, a sepal; 4, a petal; 5, ovary; 6, a carpel; 7, a leaflet of the var. *pinninervis* HAYATA; 8, a male flower; 9, a sepal; 10, a petal; 11, staminal column; 12, a stamen seen from without; 13, the same, seen from within.



elevatis. Racemi 10 cm. longi. Fl. ♂ : sepala 3 ovato-lanceolata 2 cm. longa 6 mm. lata apice obtusa basi contracta; petala 3 lineari-lanceolata 2 cm. longa 2 mm. lata apice obtusa laevia basi contracta; columna staminalis 1 cm. longa 2 mm. lata, filamentis toto connatis 4 mm. longis glabris, antheris linearibus fere connatis 5 mm. longis 1 mm. latis apice appendiculatis, appendiculis linearibus 1 mm. longis  $\frac{1}{4}$  mm. latis acuminatis; rudimenta carpellorum linearia 1 mm. longa.

HAB. Keitao, leg. B. HAYATA, ad 4000 ped. alt. Aprili. 1916.

Differs from the type by the more elongate leaves with pinnate veins.

### Ternstroemiaceæ.

#### *Eurya* THUNB.

***Eurya arisanensis* HAYATA** sp. nov. (Fig. 4). Arborescens. Rami et

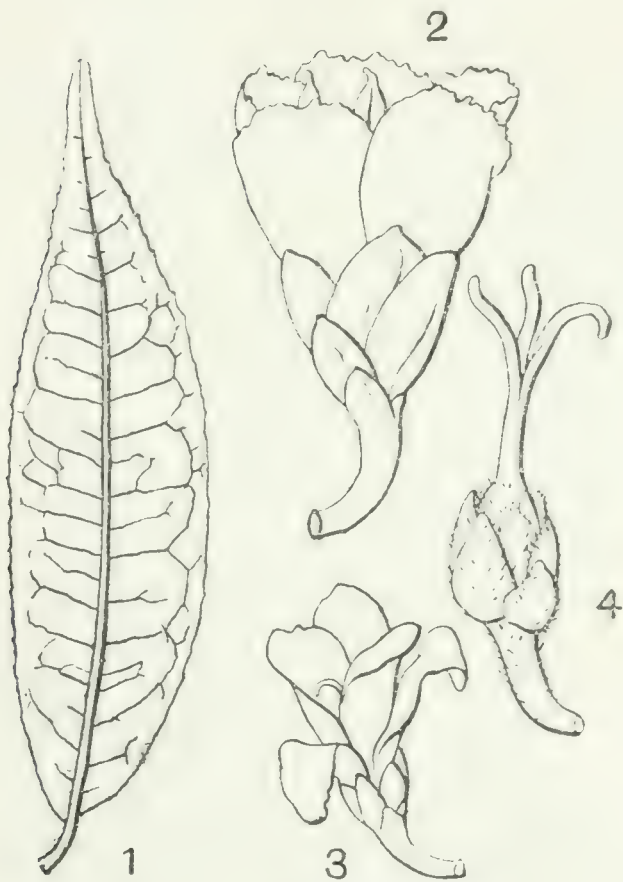


Fig. 4; *Eurya arisanensis* HAYATA; 1, a leaf; 2, a male flower; 3, a female flower, 4, a young fruit.

ramuli cinerascens vel rubescentes graciles. Folia alterna lanceolata vel oblanceolata 6–8 cm. longa 1–2 cm. lata apice acuminata vel attenuato-acuminata ad summum obtusa basi obtusa vel cuneato-obtusa margine minute serrulata coriacea, costa supra impressa subtus prominenti, utraque pagine glabra sed subtus ad costam tenuissime hirsuta vel glabra, petiolis 5 mm. longis. Racemi axillares 7–8 mm. longi solitarii, pedicellis 1 mm. longis minute pubescentibus apice bracteis 2–3 instructis. Fl. ♂ : sepala 5 inaequalia, interiora majora rotundata circ. 2 mm. in diametro apice plus minus mucronata margine ciliolata dorso minus pubescentia; petala 5 basi plus minus connata obovato-



oblonga 4 mm. longa  $2\frac{1}{2}$  mm. lata apice rotundata vel tenuiter emarginata basi plus minus angustiora margine minutissime crenulato-denticulata; stamina circ. 10, filamentis cum petalis fere toto connatis glabris  $1\frac{1}{2}$  mm. longis, antheris ovato-lanceolatis  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice cuspidato-acutis basi lobatis; rudimentum ovarii elongato-conicum apice acuminatissimum. Fl. ♀: sepala maris; petala 5 basi plus minus connata obovato-oblonga  $2\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata apice obtusissima margine crenulata; ovarium ovoideum 1 mm. longum totiusque latum apice ad stylum abeuns plus minus hirsutum, stylo 2 mm. longo glabro a medio sursum 3-4-fido, ramis gracillimis recurvatis.

HAB. Arisan, leg. B. HAYATA, Jan. 1912; et leg. U. FAURIE, (No. 1327 typus).

Near *E. gnaphalocarpa* HAYATA; but differs from it in the shape of leaves and flowers given in the accompanying figures.

**Eurya gnaphalocarpa** HAYATA sp. nov. (Fig. 5). Arborescens. Ramuli cinerascens plus minus hirsuti. Folia coriacea oblongo-lanceolata vel oblongo-ob lanceolata 6 cm. longa 2 cm. lata apice acuminata sed ad summum obtusa truncata vel retusa basi cuneata acuta margine a medio sursum serrulata basi integra, supra glabra subtus tenuiter hirsuta, petiolis 5 mm. longis hirsutis. Flores ad axillas vel ad latus ramulorum dispositi. Flores ♂: pedicellis 3 mm. longis hirsutis apice bracteis minutis 1-2 instructis, bracteis triangularibus  $\frac{1}{2}$  mm. longis ciliolatis; sepala 5 inæqualia, interiora majora triangulari-rotundata 2 mm. longa totiusque lata apice rotundata apice mucronata vel haud mucronata basi leviter contracta margine minute cilio-



Fig. 5; *Eurya gnaphalocarpa* HAYATA; 1, a leaf; 2, a male flower; 3, a female flower; 4, a fruit.

lata dorso medio plus minus pubescentia basi plus minus connata; petala 5 oblonga 4 mm. longa  $2-2\frac{1}{2}$  mm. lata apice rotundata leviter emarginata basi plus minus contracta glabra basi plus minus connata; stamina 10-15; rudimentum ovarii subconicum longe hirsutum. Fl. ♀: sepala maris; petala oblonga lineari-oblonga  $2\frac{1}{2}$  mm. longa 1 mm. lata apice rotundata emarginata basi plus minus contracta glabra toto distincta; stamina obsoleta; ovarium obovoideum  $1\frac{1}{2}$  mm. longum 1 mm. latum dense villosum, stylo columniformi glabro 2 mm. longo a medio sursum 4-fido, ramis gracilibus recurvatis glabris; fructus globosus  $2\frac{1}{2}$  mm. in diametro dense hirsutus. Semina scobiformia  $\frac{1}{2}$  mm. longa et lata rubescentia.

HAB. Mt. Morrison, Musha—Hōgō, leg. B. HAYATA, Aprili. 1916; inter Taroyen et Heishana, Rankanzan.

Near *E. distichophylla* in the hirsute carpels; but differs from it in the cuneate lanceolate leaves.

**Eurya glaberrima** HAYATA sp. nov. (Fig. 6). Arborescens; ramuli cinerascens. Folia glaberrima coriacea lineari-lanceolata 8 cm. longa 2 cm. lata apice obtusissima ad centrum summorum retusa basi cuneata vel acuta margine minute serrulata, petiolis 7-8 mm. longis glaberrimis. Flores ad axillas foliorum vel ad latus ramulorum 3-4-aggregatim dispositi. Fl. ♂: pedicellis 2 mm. longis glabris; sepala 5, interiora majora rotundata  $2\frac{1}{2}$  mm. in diametro apice emarginata glabra haud ciliolata basi plus minus contracta; petala 5 basi plus minus connata patentissima rotundata obovato-oblonga 3 mm. longa  $2\frac{1}{2}$  mm. lata apice rotundata glabra; stamina circ. 10 glabra, filamentis glabris 1 mm. longis, antheris ovato-oblongis  $\frac{2}{3}$  mm. longis  $\frac{1}{3}$  mm. latis apice obtusis; rudimentum ovarii obconicum  $\frac{2}{3}$  mm. longum glabrum. Fl. ♀: sepala maris; petala 5 obovata  $2\frac{1}{2}$  mm. longa 2 mm. lata apice emarginata basi plus minus cuneata; staminodia nulla; ovarium glabrum depresso-conico-globosum  $\frac{2}{3}$  mm.—1 mm. longum 1 mm. latum, stylo brevissimo  $\frac{1}{4}$  mm. longo 3-fido.

HAB. Arisan, leg. B. HAYATA, 1912; Gōkwanzan, leg. B. HAYATA, Aprili. 1916.

This resembles *E. japonica* TH. in the glabrous leaves; but differs from it in the lanceolate leaves with different venation; also related to *E. arisanensis* from which this is distinguishable by the very obtuse or even emarginate tip of the leaves.

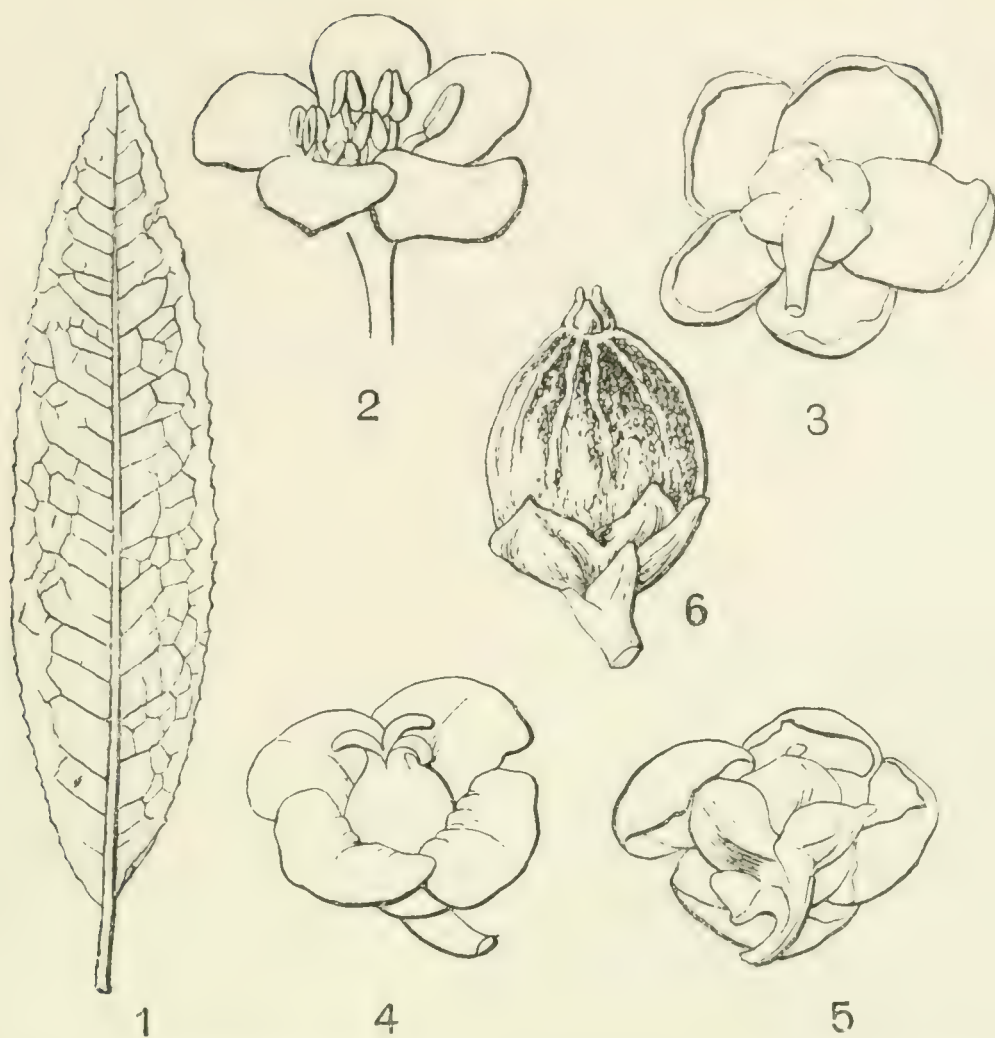


Fig. 6; *Eurya glaberrima* HAYATA; 1, a leaf; 2, a male flower; 3, the same, seen from back; 4, a female flower; 5, the same, seen from back.

NOTE: Fl. ♀: sepals purple, ovary pale green, style and stigma purple.

### *Schima* REINW.

***Schima kankaoensis*** HAYATA sp. nov. *Schima Noronhae* HAYATA Gen. Ind. Fl. Formos. p. 8 (non REINW.) pro parte. Arbor? Rami fuscentes lenticellis minutis notati. Folia ad apicem ramorum approximatinque disposita chartacea vel chartaceo-membranacea oblonga 8 cm. longa 3 cm. lata apice cuspidato-acuminata ad summum aristata basi acuta vel obtusa margine subintegra vel remote aristato-serrata utraque glabra subtus glaucissima, petioliculis 1-2 cm. longis. Flores ad axillas foliorum apicalum solitarii, pedicellis 6-7 mm. longis leviter pubescentibus. Calyx late obconicus 5-lobatus, lobis



late rotundatis 5 mm. latis 3 mm. longis apice truncato-rotundatis margine ciliatis basi contractis. Petala 5 inaequalia basi plus minus connata, majora rotundata vel obovato-rotundata  $1\frac{1}{2}$  cm. longa 13 mm. lata apice rotundata basi contracta margine integra medio crassiuscula margine tenuiora. Stamina  $\infty$  plus minus connata. Ovarium depresso-globosum apice glabrum a medio deorsum dense villosum, stylo columniformi 7–8 mm. longo glabro.

Near *Schima Noronhae* REINW. (BENTH. Fl. Hongk. p. 29; *S. javanica* Hook. Bot. Mag. t. 4539); but differs from it in having thinner leaves with a few sharp (not obtuse) teeth, and in the ovary which is hairy only at its midway down.

*Camellia* (L.) SWEET\*

***Camellia nokoensis*** HAYATA sp. nov. (Pl. II.). Frutex; rami et ramuli teretes gracillimi cinerescens. Gemma foliorum linearis acuminata dense villosa. Folia coriacea lanceolata 5 cm. longa 13 mm. lata apice acuminata ad summum obtusa vel retusa basi cuneata margine minute serrulata utraque-pagine glabra, petiolis 1–2 mm. longis vel interdum subnullis. Flores ad axillas foliorum superiorum 2–3 dispositi pedicellati, pedicellis 5 mm. longis glabris cernuis incrassatis, bracteis 2–3 triangularibus 1 mm. longis acutis. Sepala 5 persistentia triangularia 2 mm. longa glabra. Petala 6–7 basi plus minus connata, exteriora minora rotundata 6 mm. in diametro glabra margine ciliolata, interiora obovato-rotundata 10 mm. longa 8–9 mm. lata apice rotundata vel emarginata margine minute ciliolata basi contracta. Stamina  $\infty$  glabra, filamentis basi plus minus connatis 7–10 mm. longis apice hirsutis, antheris

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\* In taking *Camellia* as a generic name, I am following Mr. C. P. STUART who expressed his opinion in his "Voorbereinde onderzoekingen ten dienste van de selekte der theeplant." To resume his opinion as to the question whether *Camellia* or *Thea* should stand for a generic name, as he wrote me, — "since the scientific world has universally adopted the combination of *Camellia* and *Thea* into one genus, there has been a great deal of controversy as to which name ought to be chosen, because the fundamental work on nomenclature, LINNAEUS' Spec. Plant. ed. I. (1753), contained both. French and German botanists have preferred *Thea*, because KÆMPFER used it as early as 1712, but modern nomenclature rules reject this authority, whereas British authors have referred to LINNAEUS' book, where *Thea* was wrongly, *Camellia* correctly defined. Moreover, it has been decided by the aforesaid international rules that in case of combination of two groups, the author has the right to choose the name of the united group. Now, in our case, SWEET (1818) was the first author who united *Camellia* and *Thea*, and he applied the first name to the united genus. So there is not the least doubt that *Camellia* is the correct generic name."

cordatis  $1\frac{1}{2}$  mm. longis apice apiculatis. Ovarium oblongum glabrum, stylo 1 cm. longo glabro apice 3-fido. *Thea nokoensis* HAY. in Herb. Taihoku.

HAB. Nōkōzan, ad 8000 ped. alt., leg. R. KANEHIRA, Y. SHIMADA et S. SASAKI, Mart. 1918, (No. 63).

Near *Thea transarisanensis* HAYATA, but differs from it in having pedicellate nodding flowers with quite glabrous sepals and petals.

**Camellia transnokoensis** HAYATA sp. nov. Frutex, rami et ramuli gracilissimi cinerascens; gemma foliorum acuminata glabra. Folia oblonga oblongo-lanceolata 3–4 cm. longa  $1\frac{1}{2}$  cm. lata apice acuminata ad summum obtusa et retusa basi obtusa vel cuneata margine serrulata coriacea utraque glabra. Flores ad ramulos subterminales sessiles, bracteis 3–4 triangularibus gradatim ad sepala abeuntibus. Sepala 5 persistentia rotundato-triangularia margine hirsuta 3 mm. longa totiusque lata glabra. Petala 5 glabra rotundata 5 mm. in diametro. Stamina  $\infty$ . Ovarium subglobosum 1 mm. longum glabrum, stylo 3 mm. longo glabro apice 3-fido. *Thea transnokoensis* HAY. in Herb. Taihoku.

HAB. Nōkōzan, ad 8000 ped. alt., leg. R. KANEHIRA, Y. SHIMADA et S. SASAKI, Mart. 1918 (No. 48).

Near *Thea nokoensis* HAYATA, but differs from it in having quite sessile flowers and in the quite glabrous leaf-buds.

**Camellia oleifera** ABEL, "Narr. Journ. China, 363, p. 174."

*Thea oleifera* REHDER et WILSON in Plantæ Wilsonianæ Vol. II.—2, p. 393.

*Thea biflora* HAYATA Gen. Ind. p. 8.

**Camellia hozanensis** HAYATA n.n.

*Thea hozanensis* HAYATA Ic. Pl. Formos. VII. p. 2.

**Camellia Nakaii** HAYATA n.n.

*Thea Nakaii* HAYATA Ic. Pl. Formos. VII. p. 3.

## Dilleniaceæ.

### *Actinidia* LINDL.

**Actinidia arisanensis** HAYATA sp. nov. Scandentissima, ramis teretibus lenticellis minutis multo notatis, ramulis hornotinis gracilibus apice approxi-

matim foliiferis. Folia alterna oblonga vel oblongo-rotundata  $7\frac{1}{2}$  cm. longa 5 cm. lata apice breve cuspidato-acuta basi obtusa rotundata margine serrulata, serrulis 1 mm. longis a se 3 mm. remotis, supra glabra subtus primum floccosa demum glabra subtus pallida chartacea, petiolis 1–2 cm. longis glabris. Sepala 5 oblonga 4 mm. longa 2 mm. lata apice rotundata basi haud vel vix contracta dorso glabra margine pubescentia. Petala 5 oblongo-obovata vel oblanceolata 7 mm. longa 3 mm. lata apice rotundata basi cuneato-contracta. Stamina  $\infty$ , filamentis glabris filiformibus, antheris oblongis  $1\frac{1}{3}$  mm. longis  $\frac{2}{3}$  mm. latis apice obtusis basi 2-lobatis. Ovarium globosum dense tomentosum 2 mm. in diametro; stylis circ. 20 filiformibus 4 mm. longis apice oblique clavatis.

HAB. Arisan, inter Taroyen et Heishana, leg. B. HAYATA, Aprili. 1912.

Differs from *A. rankanensis* by the leaves which are nearly obtuse or slightly cuneate at the base. In *A. rankanensis*, the leaves are very cuneate at the base.

NOTE: Flowers yellowish white, but reddish at the base of the petals and sepals.

**Actinidia formosana** HAYATA n. n. *Actinidia callosa* LINDL. var. *formosana* FINET et GAGN.; HAYATA Gen. Ind. Fl. Formos. p. 8. Scandentissima Folia versus apicem ramuli hornotini alternatim disposita oblonga elliptica vel ovato-oblonga 10–11 cm. longa 5–6 cm. lata apice cuspidato-acuminata basi obtusissima vel rotundata chartacea margine remote serrulata, serrulis a se 5 mm. remotis aristiformibus 1 mm. longis recurvis, utraque pagine glabra concolora, petiolis 3–5 cm. longis. Cymæ ad axillas foliorum inferiorum dispositæ 5 cm. longæ versus apicem ramosæ 10–15-floratae dense pubescentes, pedicellis 7–8 mm. longis, bracteis minutis linearibus tomentosis. Sepala 5 plus minus connata oblonga 5 mm. longa 3 mm. lata apice obtusa basi plus minus angustiora connata extus dense intus laxè pubescentia. Petala 5 obovata 7 mm. longa 4 mm. lata apice rotundata basi angustiora glabra. Stamina  $\infty$ , filamentis distinctis glabris filiformibus, antheris oblongo-ovatis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice acutis basi profunde cordatis. Rudimentum ovarii dense tomentosum. Fructus obovoideus 3 cm. longus 18 mm. latus dense verrucosus.

HAB. Kelung, leg. S. SŌMA, (typus!); Ōchōbi, leg. B. HAYATA. Mai. 1916; Daiton, leg. U. FAURIE; Sōzan, leg. Y. SHIMADA.



This differs from *A. callosa* LINDL. specifically in the obovoid fruits.

NOTE: Leaves dark-green, shining above; petals purple towards the base, but white towards the tip; pith partly lamellate, partly solid.

**Actinidia rankanensis** HAYATA sp. nov. Scandentissima, rami et ramuli gracillimi. Folia alterna secus ramulos hornotinos disposita obovato-oblonga 6 cm. longa  $2\frac{1}{2}$  cm. lata apice subito acuminata basi cuneata chartacea margine arguto-serrulata, serrulis minutis aristiformibus 1 mm. longis a se 3–4 mm. remotis, versus basin integra apice ad summum arista callosa instructa, petiolis 5–10 mm. longis. Cymæ 3–4-floratae axillares vel versus basin ramulorum foliiferorum dispositae graciles glabrae, bracteis minutis, pedicellis 5–10 mm. longis. Sepala 5 subæqualia oblonga subglabra 3 mm. longa 2 mm. lata apice obtusa basi plus minus contracta margine integra ciliata vel versus marginem pubescentia basi plus minus connata. Petala 5 obovata 7 mm. longa  $3\frac{1}{2}$  mm. lata apice rotundata basi angustiora integra. Stamina circ. 20, filamentis distinctis filiformibus 5 mm. longis glabris, antheris oblongo-ovatis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice acutis basi profunde cordatis. Rudimentum ovarii ovoideum 2 mm. longum, stylis  $\frac{1}{2}$  mm. longis 10–15 distinctis radiatim patentibus.

HAB. Rankanzan, leg. B. HAYATA, Mai. 1916.

Near *A. callosa*, but differs from it by the obovate-cuneate leaves and in the nearly glabrous sepals.

NOTE: Leaves perfectly glabrous, dark-green shining above; sepals light cream-red; rudimental ovary yellow.

**Actinidia remoganensis** HAYATA sp. nov. Scandentissima. Folia versus apicem ramuli hornotini alternatim disposita oblonga vel obovato-oblonga 9–10 cm. longa  $4\frac{1}{2}$  cm. lata apice breve cuspidato-acuta basi obtusissima rotundata margine subintegra vel remote aristulis 1 mm. longis a se 5 mm. distantibus instructa utraque glabra subtus pallidissima chartacea, petiolis 2– $2\frac{1}{2}$  cm. longis glabris. Sepala 5 oblonga  $3\frac{1}{2}$  mm. longa  $2\frac{1}{2}$  mm. lata apice rotundata glabra margine plus minus pubescentia. Petala spathulata  $6\frac{1}{2}$  mm. longa  $2\frac{1}{2}$  mm. lata apice rotundata basi subcuneata glabra. Stamina circ. 20, antheris oblongis  $1\frac{1}{2}$  mm. longis 1 mm. latis apice obtusis emarginatis basi 2-lobulatis. Rudimentum ovarii ovoideum dense tomentosum.

HAB. Remogan, leg. B. HAYATA, Mai. 1916.

Near *A. rankanensis*, but distinguishable from it in the less serrulate or nearly entire leaves and in the narrower petals.

NOTE: Leaves dark-green shining above; sepals very slightly purple; petals white.

*Clematoclethra* MAXIM.

**Clematoclethra** sp. HAB. Shichiseitonzan, leg. T. SōMA, 1912.

The fruits are very much like those of *Clematoclethra*; but the specimen being too imperfect, the exact determination is impossible.

Rutaceæ.

*Glycosmis* CORREA.

**Glycosmis erythrocarpa** HAYATA n. n. *Citrus erythrocarpa* HAYATA Ic. Pl. Formos. VI. p. 13.

Near *G. pentaphylla* DC.; but differs from it in the much smaller leaflets which are usually ternate, the lateral ones being nearly opposite.

*Murraya* LINN.

**Murraya Koenigii** SPRENG; HAYATA Gen. Ind. Fl. Formos. p. 12.

*Murraya euchrestifolia* HAYATA Ic. Pl. Formos. VI. p. 11.

*Citrus* LINN.\*

**Citrus medica** LINN.; SWINGLE in BAILEY Stand. Cycl. Hort. p. 781 fig. 971.

*Citrus medica* LINN. subsp. *genuina* ENGL.; HAYATA Gen. Ind. p. 11.

HAB. Shintiku cult.

NOM. JAP. *Maru-Busshukan* 圓佛手柑, 枸櫞.

**Citrus medica** LINN. var. **sarcodactylis** SWINGLE in BAILEY Stand. Cycl. Hort. p. 781, fig. 793. Frutex  $2\frac{1}{2}$  m. altus 4 m. latus. Rami valde divaricati validissimi plus minus inclinati generaliter longissimi. Flores axillares brevissime racemosi vel subglomerati, pedicellis 1-2 mm. longis glabris. Calyx obconicus 1 cm. longus 9 mm. latus apice 5-lobatus, lobis late triangularibus brevissimis 4 mm. latis 1 mm. longis acutis. Petala extus rubro-

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\* I am much indebted to Mr. Y. TAMURA for his kind informations on this group of plants.

violascentia intus alba oblanceolato-linearia 23 mm. longa 8 mm. lata incrassata apice obtusa basi haud contracta. Stamina circ. 30, filamentis hirsutis plus minus connatis, antheris linearibus  $6\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice truncatis sed ad summum apiculatis basi 2-lobatis. Discus haud visus. Ovarium in abortu depressum, stylo breve colum niformi; stigma digitato-fissum, segmentis connatum.

*Citrus medica* LINN. var. *digitata* RISS.; HAYATA l.c. p. 11.

NOM. JAP. *Bussjukan* 佛手柑.

HAB. Shintiku (cult.), leg. B. HAYATA, Aprili. 1915.

NOTE: Colour on the outer side of the petals is like that of No. 553, c. in KLIN. et VAL. Cod. Coul.\*

**Citrus Limonia** OSBECK; SWINGLE l.c. p. 781.

*Citrus medica* LINN. subsp. *Limonum* Hook f.; HAYATA Gen. Ind. p. 11.

HAB. Shirin, cult.

NOM. JAP. *Lemon* 檸檬.

**Citrus gaoganensis** HAYATA sp. nov. Frutex, ramulis complanato-triquetris 5 mm. latis, spinis ad axillas 4 mm. longis instructis. Folia oblonga 7-10 cm. longa 3- $5\frac{1}{2}$  cm. lata basi cuneata vel obtusissima apice triangulari-obtusa ad summum retusa margine subintegra vel tenuissime crenata, petiolis brevioribus 5-6 mm. longis. Flores axillares solitarii, pedicellis 5 mm. longis. Calyx late cupuliformis subinteger. Petala 5 linearia 2 cm. longa 4 mm. lata apice obtusissima ad basin 2-3 mm. lata extus plus minus purpurascentia intus albicantia. Stamina circ. 30 basi usque ad medium connata, antheris oblongo-linearibus. Ovarium oblongum 2-3 mm. longum, stylo columnari 8 mm. longo, stigmate globoso; discus cupuliformis 3 mm. in diametro. Fructus ellipsoideus 4-5 cm. longus 4- $4\frac{1}{2}$  cm. latus apice tenuissime apiculatus, pericarpio tenuissimo 2 mm. crasso flavescenti, 9-10-ocularis; medulla solida tenui, carnibus duleibus.

HAB. Gaogan, sponte crescens.

NOM. JAP. *Seiban-Lemon*.

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\* KLINCKSIECK et VALETTE:—Code des Couleurs à l' Usage des Naturalistes, Artistes, Commerçants et Industriels, 720 Échantillons des Couleurs, classés d'après la Méthode Chevreul simplifiée, (Paris), 1908.



Near *Citrus Limonia* OSBECK, but distinguishable from it in the more rounded fruits with sweet pulp.

**Citrus depressa** HAYATA sp. nov. Frutex, ramulis viridissimis complanato-triquetris ad angulos obtusis flexuosis, interdum spinis  $1-1\frac{1}{2}$  cm. longis ad axillas foliorum instructis. Folia ovato-oblonga 8-9 cm. longa  $3\frac{1}{2}-4$  cm. lata apice leviter acuminata ad summum late obtusa ad centrum retusa basi late triangulari-obtusa margine subintegra leviter crenulata, petiolis 8 mm. longis angustissime alatis. Fructus depresso-globosus terminalis (pedunculis brevissimis) 23 mm. longus  $4\frac{1}{2}$  cm. latus rotundatus in circumscriptione vel interdum tenuiter lobulatus apice profunde basi tenuiter impressus, loculis 7-9, pericarpio tenuissimo 1 mm. crasso luteo-flavescenti sublævi, carnibus acidis. Semina ovoidea 1 cm. longa 6 mm. lata apice acuta rostrata ad summum obtusa, embryonibus pallido-viridescentibus.

HAB. Gaogan, sponte crescens.

NOM. JAP. *Hirami-Lemon*.

Resembles *Citrus limonelloides* HAY., but differs from it in the very much depressed and smaller fruits.

**Citrus limonelloides** HAYATA sp. nov. Frutex 2-3 m. altus, ramis ascendentibus, ramulis viridibus ad axillas foliorum spinis 3-4 mm. longis instructis. Folia lanceolata vel oblongo-lanceolata apice obtusa ad summum plus minus retusa basi obtusa margine minute obscureque crenulata, petiolis 1 cm. longis haud vel vix alatis. Flores in alabastro extus purpurascens obovoideo-clavati, pedunculis 4 mm. longis; flores apertientes 2 cm. longi extus leviter purpurascens intus albicantes. Calyx cupuliformis 2 mm. longus 4 mm. latus margine leviter 5-dentatus, dentibus brevissimis latissimis acutis pallido-flavescentibus. Petala 5 oblanceolata 18 mm. longa 6 mm. lata extus medio purpurascens intus albicans apice triangulari-acuta basi attenuata ad basin 2 mm. lata intus concava. Stamina basi leviter connata fere libera, inæqualia, longiora 12 mm. longa, breviora 8 mm. longa. Ovarium viride ovoideum  $2\frac{1}{2}$  mm. longum, stylo columnari 7 mm. longo, stigmate clavato flavo; disco cupuliformi  $2\frac{1}{2}$  mm. in diametro. Fructus axillaris, pedunculis 5-6 mm. longis, globosus  $3\frac{1}{2}-4\frac{1}{2}$  cm. latus totiusque longus apice breve apiculatus, loculis 6-9, medulla tenui solida vel in maturo cava, carnibus acidis, pericarpio

2-3 mm. crasso rubescenti; seminibus ovoideis 1 cm. longis apice rostrato-acutis, embryonibus albicantibus.

HAB. Jokirin, Shirin, Shashi, cult.

NOM. JAP. *Hime-Lemon*.

Somewhat resembles *C. Limonia*; but greatly differs from it in the much smaller leaves and smaller fruits with a reddish skin. The new *Citrus* blossoms in the beginning of February, and the fruits mature in January. The origin of this tree is quite uncertain. The type is more than 10 years old.

**Citrus grandis** OSBECK (Fig. 7); SWINGLE l.c. p. 782, fig. 975, form. **Buntan.** Frutex vel arborescens 6 m. altus, 4 m. latus longior quam latior. Folia oblonga 13 cm. longa 8 cm. lata apice obtusa et leviter retusa basi rotundato-obtusa margine integra leviter undulata crasse coriacea utraque pagine glabra, petiolis 28 mm. longis late alatis cum ala obcordato-cuneatis apice cordatis basi cuneatis circ. 2 cm. latis. Flores racemosi, racemis 9 cm.

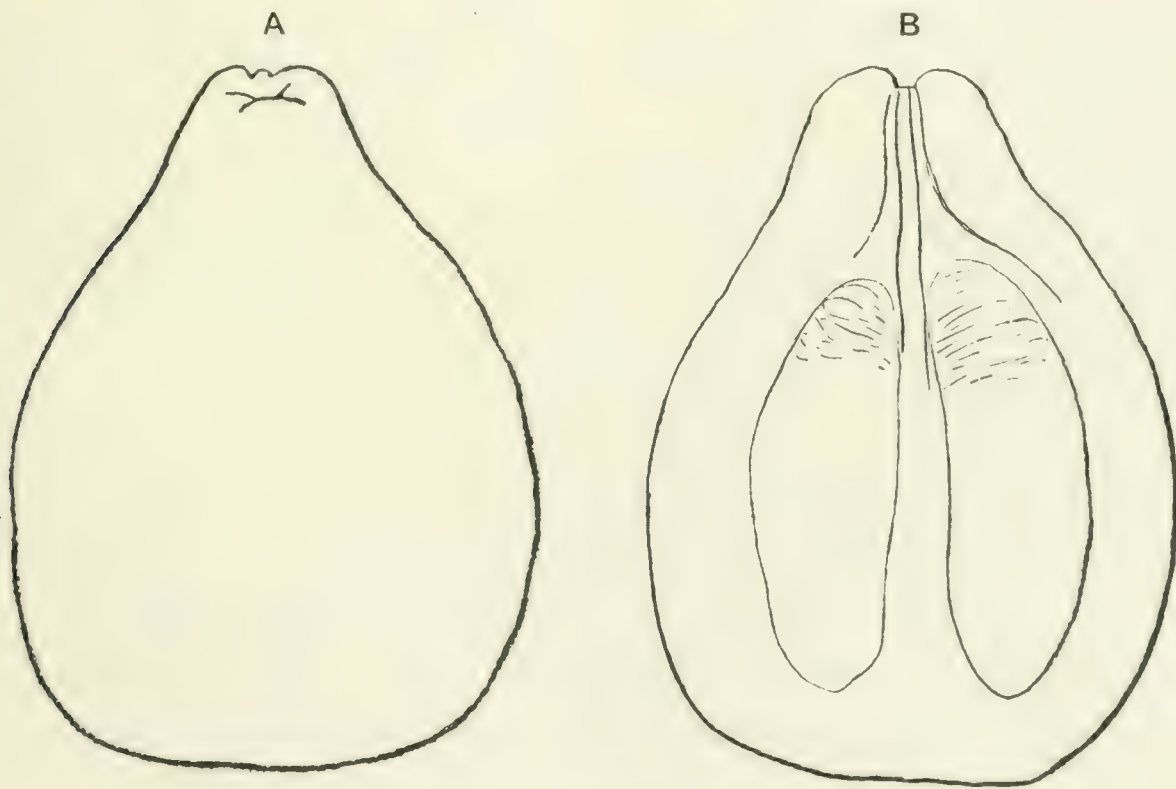
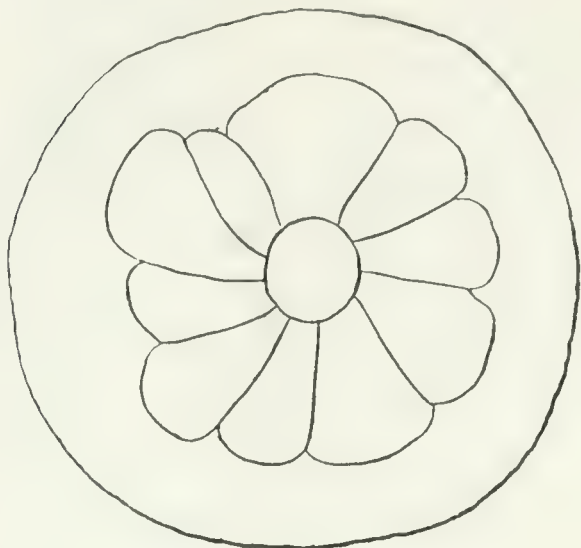


Fig. 7; *Citrus grandis* OSBECK form. *Buntan*.  $\times \frac{1}{2}$ .

longis, pedicellis cum rhachibus et calycibus tenuiter villosopubescentibus 2 cm. longis. Calyx hirsutus cupuliformis 5 mm. longus 13 mm. latus 4-dentatus, dentibus minutis. Petala 4 leviter crassiuscula oblonga vel oblongo-linearia

3 cm. longa 14 mm. lata apice obsusa basi haud vel leviter contracta valde reflexa. Stamina circ. 40, antheris linearibus 6 mm. longis  $1\frac{1}{2}$  mm. latis apice apiculatis basi 2-lobatis. Discus annuliformis. Ovarium obovoideo-cylindricum 7 mm. longum 6 mm. latum sursum hirsutum, stylo columnari 12 mm. longo



*Citrus grandis* OSBECK form. *Buntan*.  $\times \frac{1}{2}$ . This specimen is taken from a young tree; a specimen from an older one has a much thinner peel.

3 mm. crasso, stigmatibus pulviniformi 3 mm. alto 7-8 mm. in diametro subpeltato. Fructus pyriformis 12 cm. longus 11 cm. latus circ. 10-locularis, pericarpio crasso flavescenti; carnibus fere albicantibus.

HAB. Shintiku, Shirin, leg. B. HAYATA.

NOM. JAP. *Buntan*, 文旦.

NOTE: Flowers towards the end of March.

The present species is principally distinguishable from the following

one, *Zabon*, in the shape of the fruits, as can be seen in the accompanying figures. Leaves of the former are more densely arranged and their surfaces are less undulate; but those of the latter are less densely arranged and their surfaces are much more undulate. Wings of the petioles in *Zabon* are smaller than those of *Buntan*. But these differences just given can never be regarded as constant; there are very many exceptions.

**Citrus Sabon** SIEB. Synopsis Plantarum Oeconomicarum Universi Regni Japonici, in Verh. Batav. Gen. XII. (1830) p. 59, (nomen nudum). Frutex vel arborescens 7 m. altus latior quam longior, rami validissimi divaricati vel plus minus inclinati. Fructus depressoglobosus 18 cm. longus totiusque latus apice plus minus conicus basi depressus, pericarpio flavescenti, carnibus purpurascens, 10-15-locularis.

*Citrus decumana* LOUR.; HAYATA Gen. Ind. p. 11.

HAB. Shinkiku, Shirin, ubique cult.

NOM. JAP. *Zabon*, 朱欖; Yū, 柚.

There are several forms of this *Citrus*. They are as follows.



Form. **Jiyū** (時柚) Seeds very many; fruits nearly globose, more or less depressed  $8\frac{1}{2}$  cm. long  $9\frac{1}{2}$  cm. broad, the smallest of all forms of this *Citrus*: peel  $1\frac{1}{2}$  cm. thick, pulp bitter slightly purple; usually grown by seeds. There are two forms, one has slightly purple pulp, the other white pulp.

Form. **Sōyū** (早柚): Fruits ovoid more or less depressed and impressed at the base and apex, 18–19 cm. long, 16–17 cm. broad, skin  $1\frac{1}{2}$  cm. thick; pulp slightly purple.

Form. **Banyū** (晩柚) Fruits larger and more rounded than the preceding form, nearly as long as broad, 19 cm. long; peel thicker than the preceding,  $2\frac{1}{2}$  cm. thick; pulp slightly purple.

Form. **Sekitōyū** (石頭柚) (Fig. 8) Fruits rounded like the preceding form, but more or less pyriformed towards the peduncle, 17 cm. long, 18 cm. broad; peel the thinnest of all forms of this *Citrus*,  $1\frac{1}{2}$  cm. thick; pulp slightly purple like the preceding. Cells mostly 16.

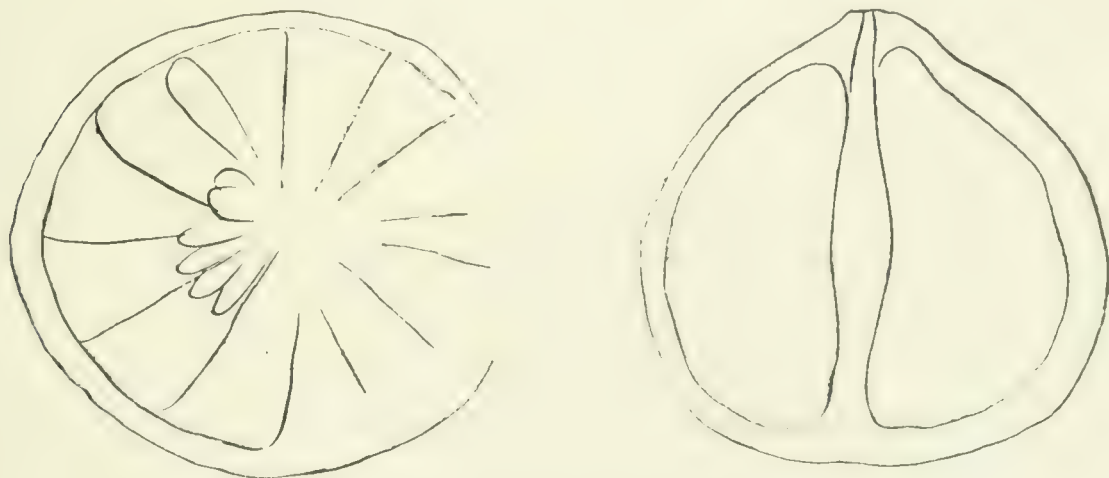


Fig. 8; *Citrus Sabon* HAYATA form. *Sekitōyū*.  $\times \frac{1}{4}$ .

Form. **Mitsuyū** (密柚) Fruits more depressingly rounded than the other forms, large as the preceding, pulp slightly purple, much softer than any other form, peel thin as the preceding.

Form. **Hakunikuyū** (白肉柚) Fruits ovoidly rounded, 17 cm. long, 16 cm. broad, peel usually thicker than the preceding forms, 22 mm. thick, white; pulp not purple, nearly white, sweeter than any other forms.

**Citrus mitis** BLANCO (Fig. 9); SWINGLE l.c. p. 784. Frutex 3 m. altus  $2\frac{1}{2}$  m. latus. Rami ascendentes vel divaricati acute triquetri, ramulis sterilibus

ad axillas spinescentibus, spinis 5 mm. longis, ramulis fertilibus inermibus. Folia tenuiter coriacea oblonga vel obovata 6–7 cm. longa  $3\frac{1}{2}$ –4 cm. lata apice obtusa vel obtusissima interdum retusa basi cuneata margine obscure crenulata, petiolis 1 cm. longis angustissime alatis, alis  $\frac{2}{3}$  mm. latis, vel haud alatis. Flores albi axillares solitarii, pedicellis 4 mm. longis. Calyx campanulato-cupuliformis 4–5 mm. in diametro 5-dentatus, dentibus triangularibus acutis plus minus flavescentibus. Petala 5 lineari-oblonga  $1\frac{1}{2}$  cm. longa 5 mm. lata apice triangulari-acuta. Stamina circ. 20 toto connata. Ovarium viride; stylo columnari, stigmate globoso-obconico. Fructus subterminalis subsolitaris vel axillaris globosus  $2\frac{1}{2}$  cm. longus totiusque latus, vel depressoglobosus circ. 6-locularis, medulla cava; pericarpio tenui fere stricto, carnibus valde acidis, embryonibus viridibus.

NOM. JAP. *Saiseikitsu* 再生桔, *Shikikitsu* 四季橘, *Gekkitsu* 月橘, *Tokinkan* 唐金柑.

HAB. Shintiku, cult.; Loo-choo: Yonakuni, sponte crescens, leg. Y. SHIMADA, Oct. 1917.

NOTE: Colour of the skin is like that of No. 106—No. 151 in KLIN. et VAL. Cod. des Coul.

There are two forms. They are:—

Form. **Shikikitsu**: Fruits depressingly globose 3 cm. long, 3.7 cm. broad, 7–8-celled, core hollow, embryo greenish.

HAB. Shinpō, cult.

Form. **Gekkitsu**: Flowers smaller than the preceding form. Fruits globose less depressed than the preceding form, 3 cm. long, 3.5 cm. broad, core hollow, nearly 8-celled, embryo greenish.

HAB. Shintiku, Shinpō, cult.; Gaogan, sponte crescens.

**Citrus nobilis** LOUR. var. **Ponki** HAYATA n.v. (Fig. 10). Frutex  $2\frac{1}{2}$  m. altus 3 m. latus, ramis divaricatis gracilibus subscandentibus, lateralibus inclinatis. Folia oblonga 7 cm. longa 3 cm. lata apice acuta vel acuminata ad summum obtusa et retusa basi acuta vel cuneata margine crenata tenuiter coriacea glabra, petiolis 7–10 cm. longis angustissime alatis vel haud alatis. Flores subterminales geminati vel solitarii stipitibus 5 mm. longis glabris pedicellati. Calyx subplanus glaber 5-lobatus, lobis late triangularibus  $2\frac{1}{2}$  mm. latis  $1\frac{1}{2}$

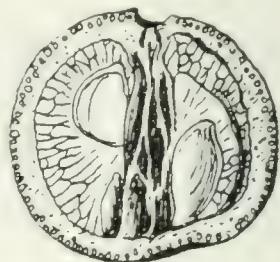


Fig. 9; *Citrus mitis* BLANCO.

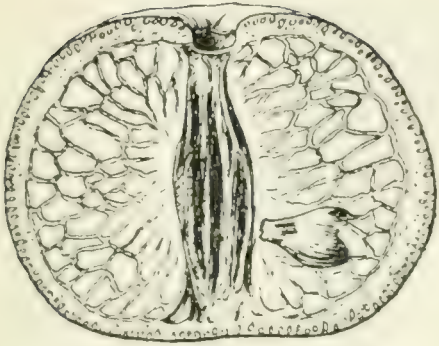


Fig. 10; *Citrus nobilis* LOUR.  
var. *Ponki* HAY.

mm. longis apicē acutis margine sub lente ciliolatis. Petala 5 patentia plus minus deorsum recurva 14 mm. longa 6 mm. lata apice obtusa plus minus contracta. Stamina circ. 20, filamentis toto a basi usque ad prope apicem connatis crassiusculis, antheris ovato-oblongis 2 mm. longis 1 mm.— $1\frac{1}{2}$  mm. latis apice obtuse apiculatis basi 2-lobatis. Discus annularis. Ovarium globosum 2 mm. longum totiusque latum glabrum viride, stylo columnari 6 mm. longo 1 mm. crasso, stigmate pulviniformi  $1\frac{1}{2}$  mm. longo  $2\frac{1}{2}$  mm. lato. Fructus depresso-globosus 3 cm. longus 4 cm. latus circ. 9-locularis, medulla cava, pericarpio tenui haud stricto; carnibus dulcibus; embryonibus albicantibus.

HAB. Shintiku, cult.

NOM. JAP. *Ponki* 凸橋.

NOTE: Colour of the skin is like that of No. 126 in KLIN. et VAL. Code des Coul. This tree, when quite old, attains a height of 2 m. 75 cm., the branches spreading over 4 m. 25 cm. in width.

**Citrus nobilis** LOUR. var. **Sunki** HAYATA n. v. Frutex 3 m. 20 cm. altus; 4 m. 30 cm. latus, latior quam longior, ramis valde divaricatis ramossissimis, ramulis triquetris ad angulos obtusis. Folia ovato-oblonga vel oblonga  $5\frac{1}{2}$  cm. longa  $3\frac{1}{2}$  cm. lata apice obtusissima ad summum emarginata vel retusa basi obtusa vel acuta margine duplicato-crenata; petiolis 1 cm. longis. Fructus axillaris vel terminalis solitarius (pedunculis brevissimis 5–6 mm. longis), depresso-globosus 33 mm. longus 47 mm. in diametro tenuissime 10-lobatus in circumscriptione apice basique impressus, pericarpio lævi luteo tenui  $1\frac{1}{2}$  mm. crasso, 7–10-locularis, medulla cava, carnibus acidis; seminibus ovoideis apice rostratis 12 mm. longis, embryonibus pallido-viridibus.

HAB. Shinpo, cult.

NOM. JAP. *Sunki* 酸橘.

This variety resembles *C. nobilis* LOUR. var. *Ponki*, but differs from it in the very much obtuse leaves and acid pulp. The leaves of this variety are rather variable, some are crenate, but others entire; some branches are spinescent, but others armless.



**Citrus nobilis** LOUR. var. **deliciosa** SWINGLE (Fig. 11). SWINGLE l.c. p. 784. Frutex  $3\frac{1}{2}$  m. longus  $3\frac{1}{4}$  m. latus, ramis ascendentibus plus minus divaricatis. Folia oblonga 7 cm. longa  $3\frac{1}{2}$  cm. lata apice obtusissima et retusa basi acuta vel obtusa margine obscure crenulata glabra, petiolis circ. 1 cm. longis angustissime alatis. Flores..... Fructus depresso-globosus  $4\frac{1}{2}$  cm. longus 6 cm. latus; pericarpio tenui laevi; medulla cava.

HAB. Shintiku, cult.

NOM. JAP. *Ankan* 紅柑. *Ōbenimikan*; Fukushū-Kan 福洲柑.

This form is very near a Chinese one, called Mandarin Orange. The fruits of this *Ankan* are smaller than those of the Mandarin Orange. The tree are

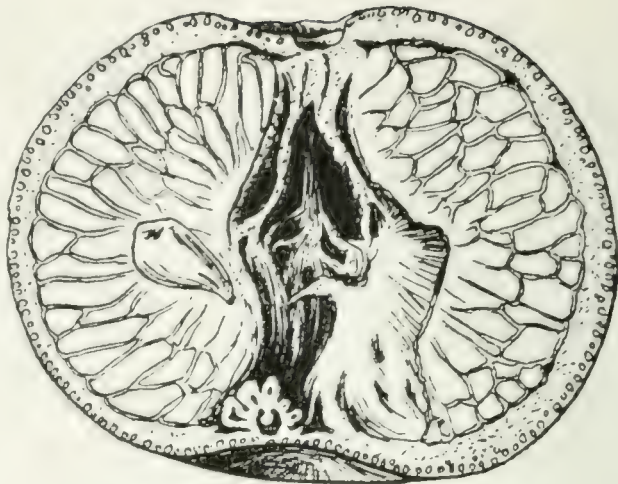


Fig. 11; *Citrus nobilis* LOUR. var. *deliciosa* SWINGLE.

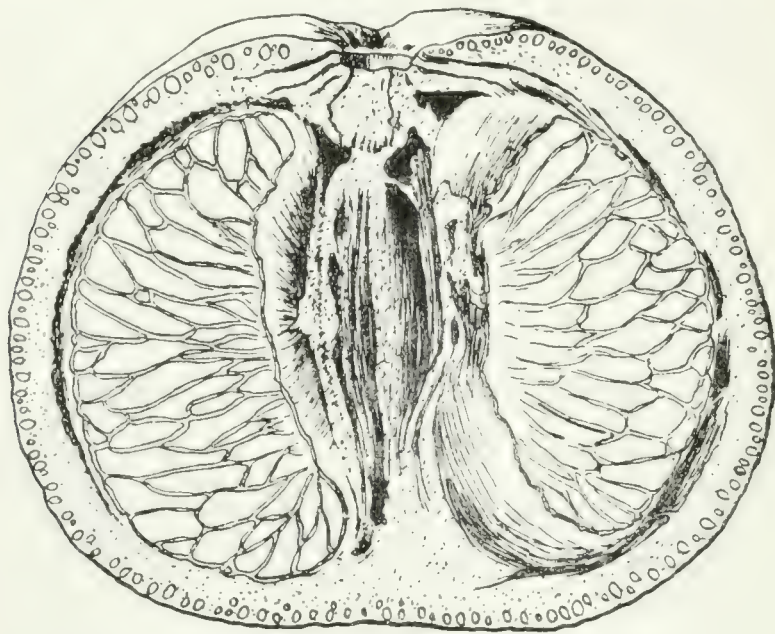


Fig. 12; *Citrus nobilis* LOUR. var. *Unshū* SWINGLE.

another form of this variety.

**Citrus nobilis** LOUR. var. **Unshū** (MAK.) SWINGLE (Fig. 12) l. c. p. 784.

HAB. Shintiku, cult.

NOM. JAP. *Unshū* 温州.

nearly the same as that of the following variety *poonensis*; but the leaves of the present *Citrus* are more dark-green, and the branches are more densely arranged. Colour of the skin is like that of No. 101 and that of the pulp is No. 126 in KLIN. et VAL. Code des Coul.

The Japanese *Usukawamikan* or simply *Mikan* is

NOTE: This differs from all the species of the Formosan *Citrus* by the very much acuminate anthers. Colour of the skin is like that of No. 106 and that of the pulp. is No. 126 in KLIN. et VAL. Code des Coul.

**Citrus nobilis** LOUR. var. **poonensis** HAYATA n. n. (Fig. 13, 14 et 15). *Citrus nobilis* HAYATA Gen. Ind. p. 11. (non LOUR.). *Citrus nobilis* LOUR. subsp. *Keonla* ENGL. var. *poonensis* C. TANAKA in the *Nōgaku-Kwaihō* No. 118, pp. 7-28. Frutex  $3\frac{1}{2}$  m. altus 3 m. latus; rami minus divaricati sub-ascendentes haud inclinati. Folia oblonga tenuiter coriacea 8-9 cm. longa  $4\frac{1}{2}$  cm. lata apice obtusissima et retusa basi acuta vel obtusa margine crenulata, petiolis circ. 1 cm. longis angustissime alatis. Flores quasiterminales vel axillares solitarii, stipitibus 5 mm. longis glabris pedicellati. Calyx gla-



Fig. 13; *Citrus nobilis* LOUR. var. *poonensis* HAYATA; showing the absence of an articulation between the style and ovary.

ber subplanus 5-lobatus, lobis triangularibus vel oblongis  $1\frac{1}{2}$ -2 mm. longis apice triangularibus margine remote vel sparsissime ciliolatis cæterum glabratis supra concavis pallido-viridescentibus. Petala 5 alba erecto-patentia plus minus deorsum recurva vel haud recurva oblonga vel lanceolata 12 mm. longa  $5\frac{1}{2}$ -6 mm. lata apice obtusa basi plus minus contracta glabra. Stamina 15-16, filamentis basi

plus minus contractis sursum distinctis crassiusculis albis 7-6 mm. longis 1 mm. latis apice angustatis, antheris flavis ovato-oblongis 2- $2\frac{1}{2}$  mm. longis  $1\frac{1}{3}$  mm. latis apice obtuse apiculatis basi cordatis vel bi-lobatis. Discus annularis. Ovarium depresso-globosum 2 mm. longum  $2\frac{1}{2}$  mm. latum, stylo columnari 7 mm. longo  $1\frac{1}{2}$  mm. lato, stigmate pulviniformi  $2\frac{1}{2}$

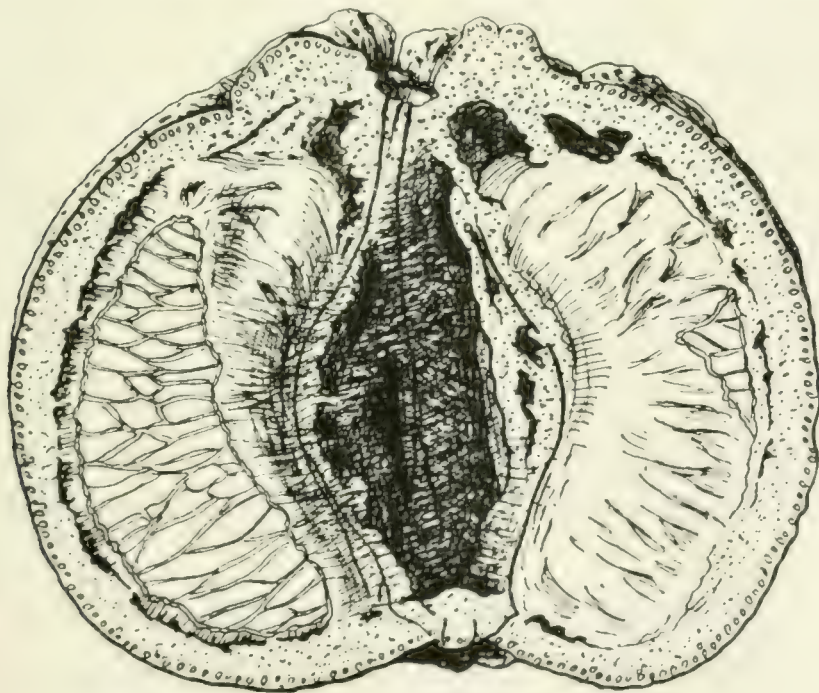


Fig. 14; *Citrus nobilis* LOUR. var. *poonensis* HAYATA; a form with a navel at the base (top in the figure).



mm. in diametro 1 mm. crasso. Fructus depresso-globosus basi interdum conico-gibbosus 7 cm. longus 8 cm. latus, pericarpio valde rugoso valde laxo haud stricto; medulla cava.

HAB. Shinpo cult.

NOM. JAP. *Ponkan*

凸柑, 椪柑.

The variety resembles *Citrus Tankan* in flowers and leaves; but the flowers are smaller, petals narrower, leaves obtuser in the present variety, than those in the latter. There is no distinct articulation between the ovary and style in the former, while

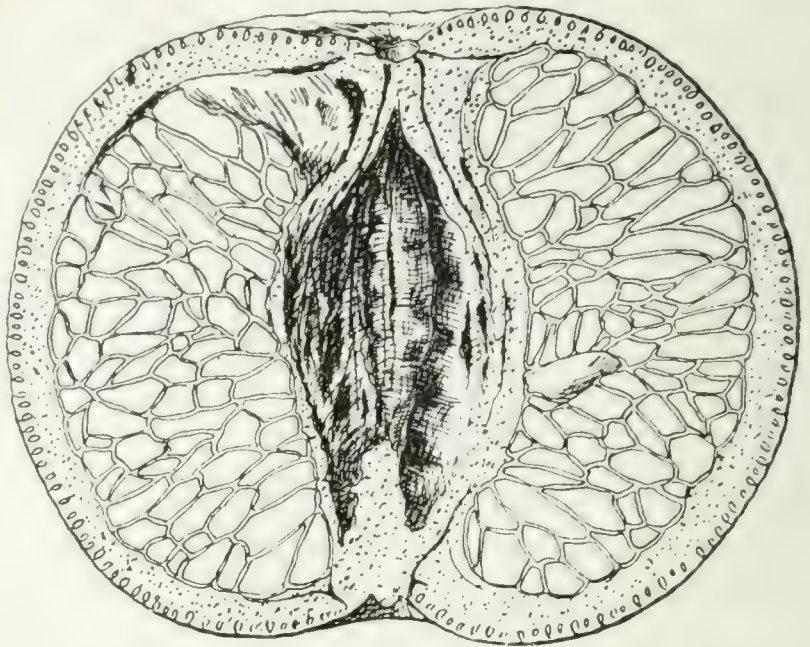


Fig. 15; *Citrus nobilis* LOUR. var. *poonensis* HAYATA; a form without a navel at the base, (top in the figure).

such is very distinct in the latter. Leaves of the variety are quite smooth on the upper surface, but those of *C. Tankan* have very minute elevated dispersed dots. The flowers of the var. *poonensis* resemble those of another variety *Ponki*; but the calyx-lobes of the former are obtuser than those of the latter. There are some points which may suggest the present orange to be a hybrid between *C. nobilis* and *C. grandis*. They are the anthers and ovary which resemble much those of *C. grandis*. But, this is, I think, a mere accidental feature, all other characters of the present orange are essentially of those of *C. nobilis*. In one form, the colour of the skin is like that of No. 151—No. 126, and that of the pulp is No. 131; while in another, the colour of the skin and pulp is like that of No. 126 in KLIN. et VAL. Code des Coul. This tree, when quite old, attains a height of 5 m. 14 cm., the branches spreading over  $4\frac{1}{2}$  m. in width.

**Citrus nobilis** LOUR. var. **Genshokan** HAYATA n. v. *C. nobilis* var. *Mikan* SIEB.? in Synopsis Plantarum Oeconomicarum Universi Regni Japonici p. 59, (nomen nudum). Frutex 3 m. 82 cm. altus, 3 m. 85 cm. latus, ramis ascenduntibus gracilibus. Folia lanceolata vel ovato-lanceolata vel oblonga



5-7 cm. longa 2 cm.-3½ cm. lata apice acuminata ad summum retusa basi acuta margine remote obscureque renulata, petiolis 8 mm. longis angustissime alatis. Fructus depressoglobosus 6½ cm. latus 4½ cm. longus, medulla cava, carnibus dulcibus; loculis circ. 10, seminibus ovoideis 1 cm. longis apice longe rostratis pallido-viridibus in sectione; pericarpis tenuibus 2 mm. crassis.

HAB. Shintiku, cult.

NOM. JAP: *Genshōkan* 元霄柑, *Jimikan*.

This fruits have a small pore at the apex, in which respect this may be identical with the Japanese *Jimikan*.

**Citrus sinensis** OSBECK; SWINGLE l.c. p. 783, fig. 977, form. **Sekkan** (Fig. 16 et 18-5). Frutex 2½ m. altus 3 m. latus; rami validi plus minus divaricati.

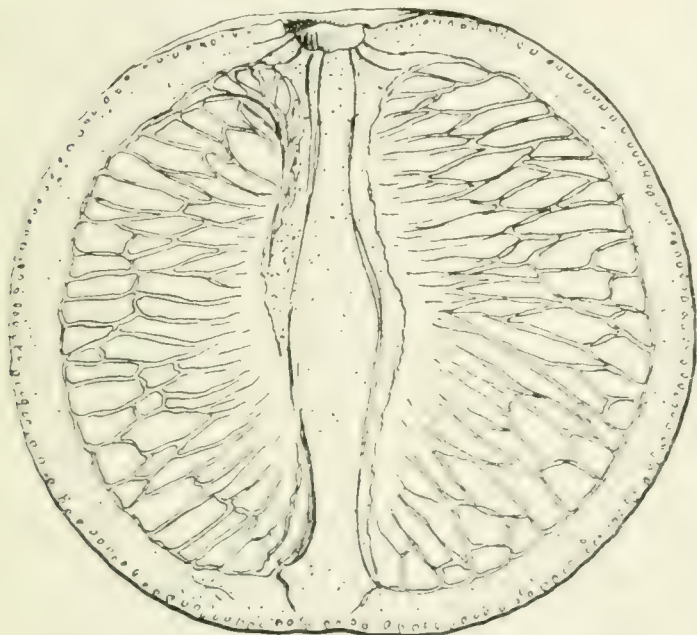


Fig. 16; *Citrus sinensis* OSBECK form. *Sekkan*.

Folia oblonga 9-10 cm. longa 5-6 cm. lata apice breve acuminata vel acuta ad summum obtusa et retusa basi acuta cuneata vel obtusa margine subintegra vel obscure serrulata versus basin integra glabra coriacea, petiolis 2 cm. longis angustissime alatis. Flores axillares vel quasiterminales solitarii vel rarius racemosi, pedicellis 1 cm. longis. Calyx cupuliformis glaber 4-5 mm. longus 6 mm. latus apice 4- vel

5-lobatus, lobis triangularibus acutis apice cuspidatis margine ciliolatis. Petala 4 obovata 12 mm. longa 9 mm. lata apice obtusa basi perfecte truncata haud contracta basi leviter sursum valde extrorse recurva. Stamina circ. 20, filamentis plus minus connatis, antheris linearibus 3 mm. longis 1½ mm. latis apice obtuse apiculatis basi 2-lobatis. Discus annularis. Ovarium globosum 3 mm. longum 3 mm. latum apice fere constrictum, stylo 7 mm. longo, stigmate pulviniformi 2 mm. longo 3 mm. in diametro. Fructus depresso globosus 6 cm. longus 7 cm. latus, medulla solida; carnibus dulcibus. Semina cuneato-ovoidea.

*Citrus Aurantium* HAYATA Gen. Ind. p. 11, (non LINN.)

HAB. Shintiku, Taihoku, cult.

NOM. JAP. *Sekkan* 雪柑. *Kinkunenbō*, *Tōmikan*.

NOTE: Colour of the skin is like that of No. 131 and that of the pulp, No. 151 in KLIN. et VAL. Cod. de Coul. Branches are somewhat like those of *C. Daidai*, but less ascending than those of *C. nobilis* var. *poonensis*. Flowers in the middle of May.

*Valencia late*, *Bahia*, *Washington Navel* and THOMPSON'S *Improved Navel* are all forms of *Citrus sinensis* OSBECK.

**Citrus Tankan** HAYATA sp. nov. (Fig. 17 et 18-6) Frutex  $2\frac{1}{4}$  m. altus  $3\frac{1}{2}$  m. latus, rami validi sed divaricati inclinati ascendent. Folia oblongo-lanceolata coriacea 9-10 cm. longa  $3\frac{1}{2}$  cm. lata apice triangulari-acuminata ad summum obtusissima et mucronata basi acuto-cuneata margine versus apicem crenata, petiolis 1 cm. longis angustissime alatis vel haud alatis. Rami ad axillas foliorum spinescentes, spinis 5 mm. longis. Fructus subglobosus 6 cm. longus totiusque latus; pericarpio plus minus stricto fere lævi vel rugoso; carnibus dulcibus; medulla partim solida partim cava.

NOTE: Colour of the skin is like that of No. 156 and that of the pulp No. 151 in KLIN. et VAL. Code des Coul.

The flowers are larger, the petals are broader and the leaves are less obtuse in this species, than in *C. nobilis* var. *poonensis*. The leaves of *Tankan* are more or less minutely and elevately dotted above in the living specimens. There is a distinct articulation between the ovary and style. Calyx-lobes of *Tankan* are acute at the apex. Flowers of this species are a little larger than those of *C. nobilis* var. *poonensis*, but of nearly the same characters of the latter. The fruits with a nearly tight skin and a solid core somewhat resemble those of *C. sinensis*. The branches too indicate the characters of those of the latter.

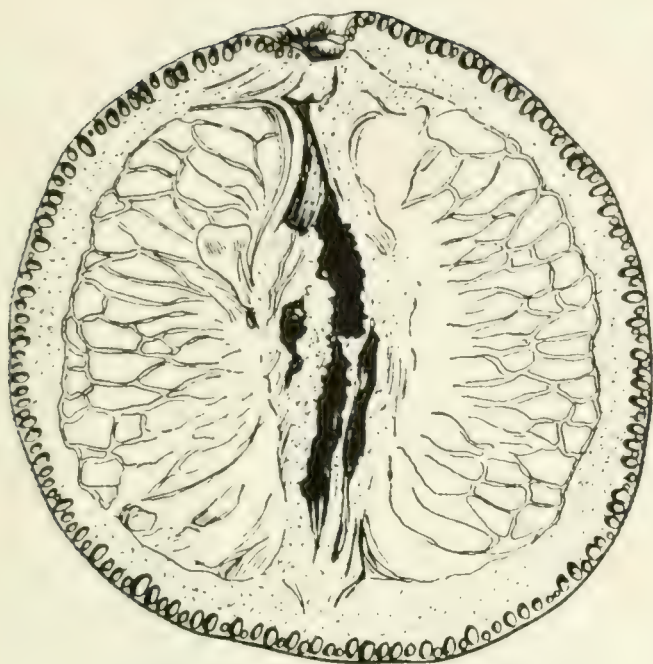
There are three forms. They are:—

**C. Tankan** proper. Fruits broadly globose 6 cm. in length, 7 cm. in width. The tree, when quite old, attains a height of nearly 4 m., the branches spreading over 5 m. in width.

HAB. Shintiku, Shirin, Washōshū.

NOM. JAP. *Tankan* 桶柑.



Fig. 17; *Citrus Tanka* HAYATA.

solid, embryo white.

HAB. Shintiku cult.

NOM. JAP. *Haili* 海梨.

**Citrus Daidai** SIEB. (Fig. 18, 1-4); SIEB. Synopsis Plantarum Oeconomiarum Universi Regni Japonici, in Verh. Batav. Gen. XII. (1830) p. 59, (nomen nudum). Folia coriacea oblonga vel elongato-oblonga 13 cm. longa 6½ cm. lata versus apicem subito acuta vel acuminata ad summum obtusa et retusa basi obtusa margine integra plus minus undulata utraque glabra, petiolis 3 cm. longis valde alatis cum alis obovato-cuneatis 1 cm. latis apice rotundatis basi cuneatis. Flores quasiterminales solitarii, pedicellis 7 mm. longis glabris crassiusculis. Calyx extus hirsutus cupuli-formis 5-sulcatus 5-lobatus, lobis erectis 4 mm. longis triangularibus 4 mm. longis 5 mm. latis apice acutis margine ciliolatis extus hirsutis basi intus callo singulo instructis. Petala 5 oblanceolata vel oblanceolato-spathulata 2½ cm. longa 7 mm. lata apice subacuta basi attenuata, partibus attenuatis 9 mm. longis 3-3½ mm. latis, plus minus costata deorsum erecta sursum extrorse recurva. Stamina circ. 20, filamentis 1 cm. longis fere toto connatis sed sursum liberis, antheris ovato-linearibus 3½ mm. longis 1-1¼ mm. latis apice obtusis vel plus minus apiculatis basi 2-lobatis. Discus annularis. Ovarium oblongum 5 mm. longum 4 mm. latum, stylo columnari 10 mm.

Form. **Koshōtankan.** Fruits a little higher than those of *Tanka* proper, 7½ cm. long, 8 cm. broad; skin more rugose and more reddish when mature; they mature a month later than *Tanka*.

HAB. Shintiku, Shirin, Washō-shū; cult.

NOM. JAP. *Kōshōtankan* 高壻桶柑.

Form. **Haili** Fruits nearly rounded slightly depressed 6-7 cm. long 7 cm. broad, skin very smooth shining, core partly hollow, partly



longo 2 mm. crasso basi plus minus dilatato cum ovariis articulado, stigmate pulviniformi 4 mm. lato 2 mm. longo. Fructus depresso-globosus  $5\frac{1}{2}$  cm. longus 6-7 cm. latus; medulla solida; carnibus acidis. Semina cuneato-ovata plus minus complanata 1 cm. longa.

HAB. Shintiku cult.

NOM. JAP. *Hyonkan* 香橙.

NOTE: Colour of the skin is like that of No. 131 or No. 156 in KLIN. et VAL. Code des Coul.

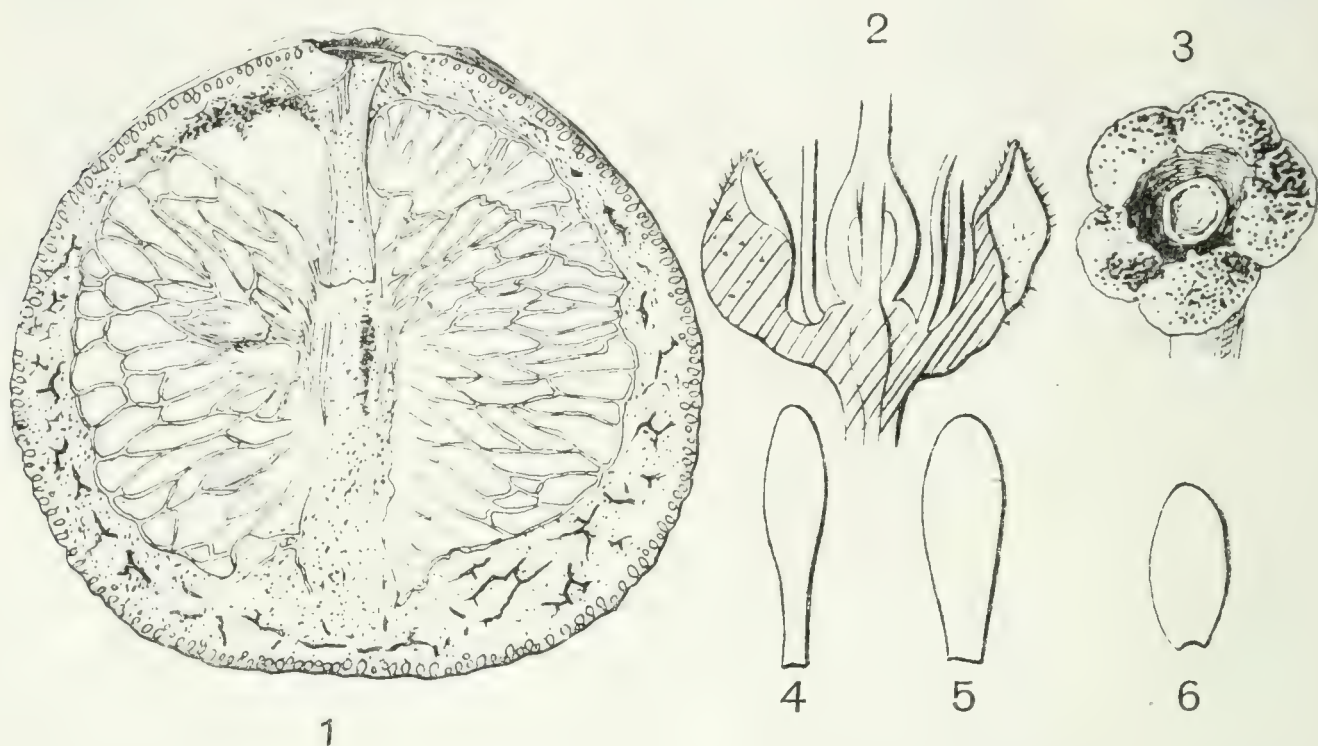


Fig. 18; Various species of *Citrus*. 1, a fruit of *Citrus Daidai* HAYATA 2, calyx and ovary in section of the same species; 3, accrescent calyx of the same; 4, petal of the same; 5, a petal of *Citrus sinensis* form. *Sekkan*; 6, a petal of *Citrus Tanka* HAYATA.

Differs from *C. Aurantium* by the fruits with a solid core. It may be hybrid between *C. Aurantium* and *C. sinensis*. Flowers in the middle of February. The present species is very near with a Japanese one, called *Daidai* 橙 or *Kwaiseikan* 恢青柑, and we think the Formosan one is identical with the latter. The petals of the present *Citrus* are much narrower than those of any of the Formosan oranges. It is nearly similar to the following species, *Natsudaidai*; the fruits come quite close to those of *C. sinensis* forma *Sekkan*.

**Citrus Natsudaidai** HAYATA sp. nov. (Fig. 19) *Citrus Aurantium* LINN. subsp. *sinensis* ENGL.; HAYATA Gen. Ind. p. 11. Frutex  $2\frac{1}{2}$  m. altus 4 m. latus; rami validi divaricatissimi. Fructus depresso-globosus 8 cm. longus 10 cm. latus; pericarpio plus minus laxo; medulla partim solida partim cava.

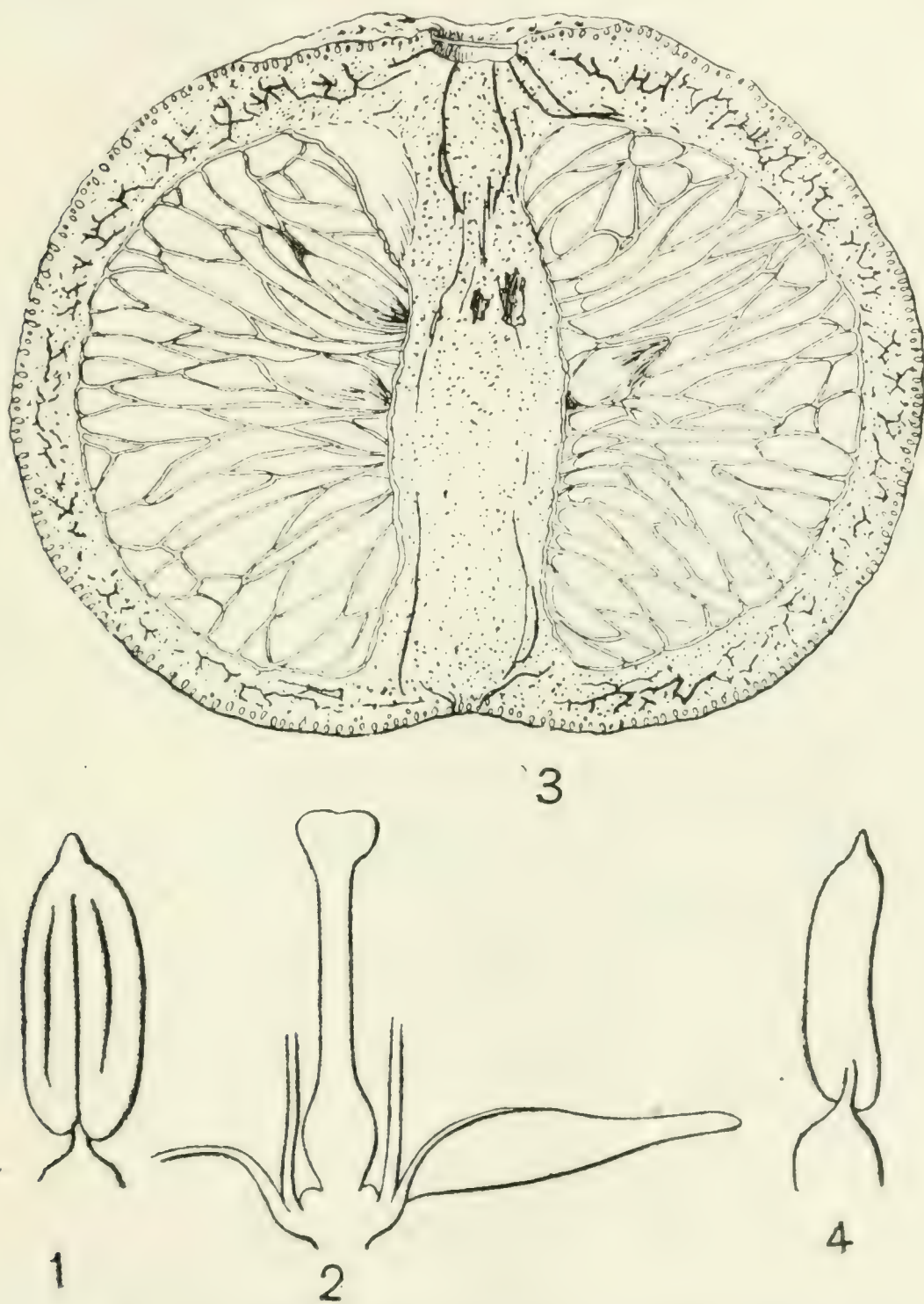


Fig. 19; 1, an anther of *Citrus Natsudaidai*; 2, calyx and ovary of the same species; 3, a fruit of the same; 4, an anther of *Citrus grandis*.



HAB. Shintiku, cult. leg. Y. SHIMADA et B. HAYATA.

This looks like a hybrid between *C. grandis* and *C. Kotokan*. The stigma of the present species, as seen in the accompanying figure, somewhat resembles that of *C. grandis*; the calyx is more or less hirsute, as is the case with the latter. There is a slight constriction between ovary and style. The anthers resemble also those of *C. grandis*. Flowers in the beginning of March.

NOM. JAP. *Natsumikan*, *Natsudaïdai* 夏橙.

NOTE: Colour of the skin is like that of No. 161 in KLIN. et VAL. Code des Coul.

**Citrus Kotokan** HAYATA sp. nov. (Fig. 20, 21) *Citrus hybrida* LINN., HAYATA Gen. Ind. p. 11. Frutex vel arborescens 4 m. altus in ambitu 5 m. latus, rami validi plus minus divaricati, ad axillas spinis 6 mm. longis instructi. Folia oblonga coriacea 10 cm. longa 6 cm. lata apice obtusissima vel acuta ad summum obtusa vel retusa basi subrotundata margine integra vel obscure crenata, petiolis 1–2 cm. longis late alatis, alis apice 3–4 mm. latis basi attenuatis. Flores axillares quasiterminales solitarii vel rarius racemosi, pedicellis incrassatis 5–7 mm. longis glabris. Calyx cupuliformis 4 mm. longus 9 mm. latus leviter 5-lobatus vel 5-dentatus, lobis 4 mm. latis 2 mm. longis apice acutis. Petala 5 obovata oblongo-obovata vel oblonga 17 mm. longa 9 mm. lata apice obtusissima basi haud vel leviter contracta. Stamina 20, antheris linearibus  $3\frac{1}{2}$  mm. longis 1 mm. latis apice obtusissimis haud apiculatis basi 2-lobatis, lobis apice obtuse acutis. Discus annularis vel pulviniformis. Ovarium depressoglobosum 4 mm. latum  $2\frac{1}{2}$  mm. longum, stylo columnari 5 mm. longo  $1\frac{1}{2}$  mm. crasso, stigmate globoso-pulviniformi 1 mm. longo 2 mm. lato. Fructus depressoglobosus 7–8 cm. longus 11 cm. latus; pericarpio plus minus constricto rugoso; medulla solida.

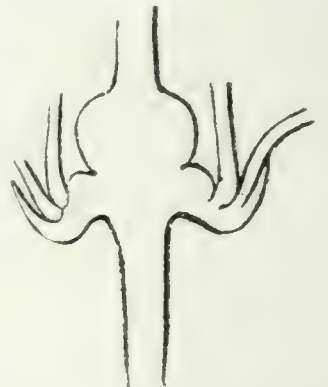


Fig. 20; *Citrus Kotokan* HAYATA.

NOM. JAP. *Kotōkan* 虎頭柑.

HAB. Shintiku, leg. B. HAYATA et Y. SHIMADA.

Flowers in the middle of April. This resembles closely *C. Daidai* in the habit of the tree, in the accrescent pedicels and calyx, and in the anthers; but it bears the character of *C. nobilis* var. *poonensis* in the depressing globose



ovary, and in the fruits and petals; at the same time, it bears some affinity to *C. grandis* in the shape of the leaves. Flowers of the present species are smaller than those of the latter, but totally different in the shape of the anthers. In the present *Citrus*, they are obtuse at the apex, while in *C. grandis* they are apiculate. Calyx is glabrous in the former, but it is hirsute in the latter. This is very probably a hybrid between *C. Aurantium*, *C. sinensis*, *C. nobilis* and *C. grandis*.

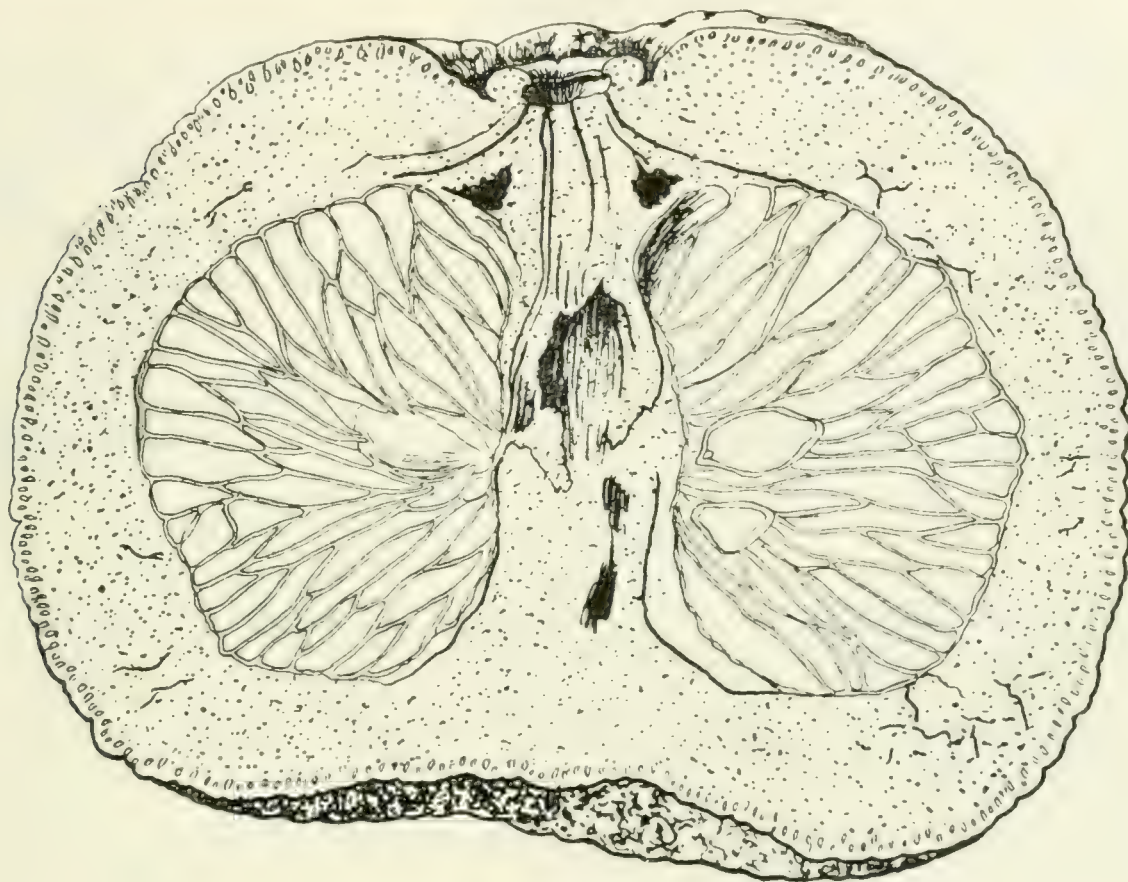


Fig. 21; *Citrus Kotokan* HAYATA.

NOTE: Colour of the skin is like that of No. 116 or that of No. 207 in KLIN. et VAL. Code des Coul.

### *Fortunella* SWINGLE.

#### *Key to Species* (after SWINGLE).

1. Fruits 4-, 5-, 6- (or rarely 7-) celled, pulp vesicles abundant, their stalks arising from the smooth ovary wall, peel of fr. thick and fleshy.

- $\alpha$ . Fruits 4 or 5-celled oval or oblong. .... *F. margarita*.  
 $\beta$ . Fruits round usually 5-6-celled. .... *F. japonica*.  
 $\gamma$ . Fruits slightly oval 6-7-celled with a thicker peel..... *F. crassifolia*.  
 2. Fruit 3-4-celled, having between the stalks of the pulp-vesicles many minute wart-like, pale yellow cellular masses, peel of fr. thin but slightly fleshy. .... *F. Hindsii*.

**Fortunella margarita** SWINGLE l. c. p. 1269, fig. 1563-1, et 1564-1.

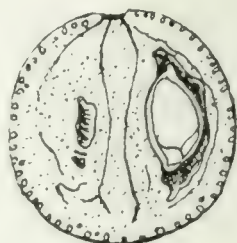
NOM. JAP. *Nagami-Kinkan* 長實金柑.

**Fortunella japonica** SWINGLE (Fig. 23), l. c. p. 1270, fig. 1563-2, et 1564-2.

NOM. JAP. *Marumi-Kinkan* 圓實金柑.

**Fortunella crassifolia** SWINGLE l. c. p. 1270, fig. 1563-3, et 1564-3.

NOM. JAP. *Nenpo-Kinkan*, *Meiwa-Kinkan* 寧波金柑, 明和金柑.



NOTE: Colour of the skin is like that of No. 131 in Fig. 23; *Fortunella japonica* SWINGLE.  
 KLIN. et VAL. Code des Coul.

### *Poncirus* RAFIN.

**Poncirus trifoliata** RAFIN.; SWINGLE in BAILEY Stand. Cycl. Hort. p. 2751, fig. 3123, 3124 et 3125.

*Aegle sepiaria* DC.; HAYATA Gen. Ind. p. 11.

NOM. JAP. *Karatachi*.

HAB. Taihoku, cult.

### Sapindaceæ.

#### *Turpinia* VENT.

**Turpinia arguta** SEEM.; BENTH. Fl. Hongk. p. 48.

*Turpinia nepalensis* HAYATA Gen. Ind. Fl. Formos. p. 16. (non WALP.).

### Leguminosæ.

#### *Entada* ADANS.

**Entada formosana** KANEHIRA Formosan Trees, p. 195.

*Entada Scandens* MATSUM. et HAYATA Enum Pl. Formos. p. 116, pro parte. (non BENTHAM).

**Entada phaseoloides** MERRILL ; KANEHIRA Formosan Trees, p. 193.

*Entada scandens* MATSUM. et HAYATA Enum. Pl. Form. p. 116, pro parte (non BENTHAM).

## Rosaceæ.

### *Rubus* LINN.

**Rubus Koehneanus** FOCKE var. **formosanus** CARD. (Subgen. *Idacobatus*, Sect. *Corchorifolii*) CARD. in Not. Syst. III. p. 306 (1917). HAB. Thai (FAURIE, 1914, No. 59).

**Rubus rosaefolius** SM. var. **formosanus** CARD. (Subgen. *Idacobatus*, Sect. *Rosaefolii*) in Not. Syst. III. p. 306 (1917). HAB. Arisan (FAURIE 1914, No. 41, 42).

**Rubus rosaefolius** SM. var. **polyphyllarius** CARD. l.c. p. 306. HAB. Arisan, (FAURIE 1914, No. 34).

**Rubus triphyllus** THUNB. var. **subconcolor** CARD. l.c. p. 311. HAB. Taihoku, Kelung, (FAURIE, 1903, No. 137 et 138).

### *Rosa* LINN.

**Rosa multiflora** THUNB. var. **formosana** CARD. in Not. Syst. III. p. 263 (1916). HAB. Arisan.

**Rosa Luciae** FRANCH. et ROCH. var. **formosana** CARD. in Not. Syst. III. p. 266 (1916).

### *Stranvaesia* LINDL.

**Stranvaesia niitakayamensis** HAYATA n.n.

*Photinia niitakayamensis* HAYATA Mater. Fl. Formos. p. 103.

## Crassulaceæ.

### *Kalanchoe* ADANS.

**Kalanchoe Takeoi** HAYATA sp. nov. Suffrutescens annua. Caulis erectus simplex haud vel paucè ramosus teres glaber ad nodos prominente elevatus.



Folia opposita crassiuscula, petiolis 4 cm. longis; inferiora cruciforme 3-partita, partibus aequalibus lanceolatis 9-10 cm. longis 2 cm. latis apice acuminatis basi attenuatis margine obscure serratis glabris; superiora minora linearia. Cymæ terminales vel axillares, bracteis linearibus minoribus glabris, pedicellis 1 cm. longis. Sepala 4 erecta lanceolata basi connata 6-7 mm. longa  $1\frac{1}{2}$  mm. lata apice acuminata crassiuscula 3-nervia glabra. Corollae tubus 1 cm. longus basi ampulli-formis 3 mm. latus glaber; limbo rotato 4-partito, partibus oblongis lanceolatis 6 mm. longis  $2\frac{1}{2}$  mm. latis apice subito acuminatis basi plus minus contractis flavis 8-9-nerviis integris. Stamina 8 ad faucem tubi 2-seriatim inserta, antheris oblongis apice emarginatis basi auriculato-cordatis  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis, partibus liberis filamentorum 1 mm. longis glabris. Ovarium ovoideum apice ad stylum attenuatum, stylis 4 distinctis 2 mm. longis.

HAB. Nantō: Hokusankō, leg. T. Itō, Sept. 1916.

Near *K. gracilis* HANCE; but differs from it by the much larger form with smaller flowers; also resembles *K. laciniata* DC. (CLARKE in Hook. f. Fl. Brit. Ind. II. p. 415), but distinguishable from it in the quite glabrous flowers with non-apiculate anthers.

## Droseraceæ.

### *Drosera* LINN.

***Drosera lunata*** BUCH.-HAM.; DC. Prodr. I. p. 319.

*Drosera peltata* Hook. f. Fl. Brit. Ind. II. p. 424.; DUNN et TUTCH. Fl. Hongk. et Kwangt. p. 100; HAYATA Ic. Pl. Formos. III. p. 113.

HAB. Toyen, leg. AIDA, Mart. 1916. New to the flora of Formosa.

## Cornaceæ.

### *Cornus* LINN.

***Cornus taiwanensis*** KANEHIRA Form. Tree p. 282.

HAB. Holisha.

## Caprifoliaceæ.

### *Viburnum* LINN.

***Viburnum mushaense*** HAYATA sp. nov. (Fig. 24) Frutex, ramuli

hornotini dense tenuiter breviterque fulvo-tomentosi demum subglabri. Folia ad apicem ramuli hornotini oppositim 2 disposita oblonga vel ovato-oblonga 11-13 cm. longa 6-7 cm. lata apice cuspidato-caudata basi subcuneata ad extremitatem tenuiter cordata margine argute dentata, dentibus cuspidiformibus triangularibus 3 mm. longis 5 mm. latis a se 7-8 mm. remotis, tenuiter chartacea [vel membranacea supra subglabra subtus hirsuta, petiolis 7 mm. longis tomentosus, stipulis nullis. Cymae terminales 3 cm. longae 6-7 cm. latae dense tomentosae, pedicellis 2 mm. longis stellato-tomentosis. Ovarium cum tubo calycis 1 mm. longum  $\frac{2}{3}$  mm. latum dense stellato-tomentosum, lobis calycis oblongis  $\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis apice truncatis extus dense tomentosus intus glabris. Corolla rotata, tubo brevissimo  $\frac{1}{4}$  mm. longo, lobis 5 oblongo-ovatis  $1\frac{2}{3}$  mm. longis  $1\frac{1}{3}$  mm. latis apice rotundatis dorso hirsutis intus glabris, filamentis glabris 2 mm. longis apice subito attenuatis filiformibus, antheris rotundatis  $\frac{1}{2}$  mm. in diametro utraque emarginatis; stylo conico  $\frac{2}{3}$  mm. longo glabro.

HAB. Musha, leg. B. HAYATA, ad 3800 ped. alt., Aprili. 1916.

Near *V. formosanum* HAY.; but differs from it in the much larger leaves with larger serration.

**Viburnum subglabrum** HAYATA sp. nov. (Fig. 25) Frutex; ramuli teretes purpureo-rubrescentes glabri. Folia opposita ad ramulos hornotinos 3-5 cm. longos 2 vel 4 disposita rotundato-cordata 8-9 cm. longa 5-6 cm. lata apice caudato-cuspidata basi tenuiter cordata margine tenuiter dentata vel serrata, serris brevissimis interdum ad mucrones reductis a se 5 mm. remotis, supra glabra subtus subglabra sed ad axillas venarum dense tomentosa, petiolis 5 mm. longis, stipulis nullis. Cymae terminales solitariae vel 4-5 congestae 2-3 cm. longae, pedunculis  $1\frac{1}{2}$  cm. longis glabris vel tenuiter hirsutis, pedicellis 2-3 mm. longis tenuiter hirsutis, bracteis caducissimis ignotis. Calycis tubus cum ovario 1 mm. longus  $\frac{2}{3}$  mm. latus tenuiter hirsutus, lobis 5 oblongis 1 mm. longis margine ciliolatis. Corolla rotata, tubo brevissimo  $\frac{1}{2}$  mm. longo, lobis 5 rotundatis  $1\frac{2}{3}$  mm. longis 2 mm. latis apice rotundatis margine minute ciliolatis utraque pagine glabris basi leviter contractis. Stamina 5, filamentis glabris  $1\frac{1}{2}$  mm. longis, antheris oblongo-cordatis 1 mm. longis  $\frac{2}{3}$  mm. latis apice emarginatis basi lobatis; stylo glabro conico 1 mm. lato apice tenuiter 3-lobato.



Fig. 24, *Viburnum mushaense* HAYATA; 1, the plant,  $\times \frac{3}{4}$ ; 2, a hair on the calyx; 3, a flower; 4, the same, seen from above; 5, margin of a corolla-lobe; 6, a stamen; 7, ovary; 8, a premature fruit.



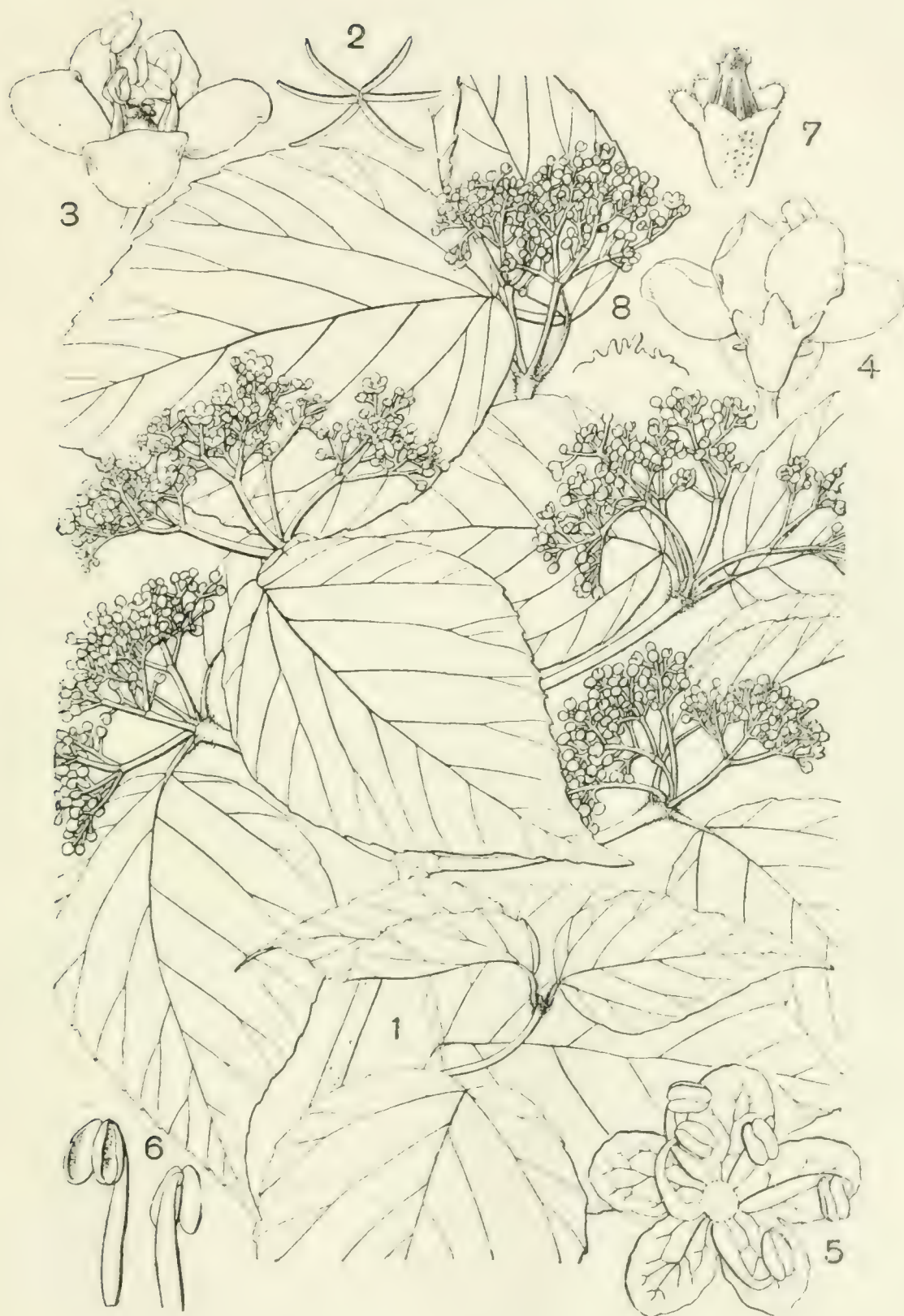


Fig. 25, *Viburnum subglabrum* HAYATA; 1, the plant  $\times \frac{2}{3}$ ; 2, a hair on the calyx; 3, 4, 5, flowers, seen from different sides; 6, stamens, seen from different sides; 7, ovary; 8, margin of a corolla-lobe.

HAB. Giran, Shōkei, leg. S. SASAKI.

Near *V. formosanum*, but differs from it in the quite glabrous leaves.

## Rubiaceæ.

### *Mussaenda* LINN.

***Mussaenda taiwaniana*** KANEHIRA Form. Tree. p. 303.

HAB. Holisha.

## Compositæ.

### *Conspectus of Genera.*

*After HOFFMANN'S system, in ENGLER'S Nat. Pfl.-fam. IV.—5, pp. 118-120.*

- A. Plant without milky juice; corolla of disc-flowers not ligulate.....TUBULIFLORÆ.
  - a. Heads homogamous, flowers tubuliformed, never yellow; anther sagittate at the base; style-branches subulate, hairy...Vernoniæ.
    - α. Heads not collected into a cluster
      - × Pappus 0.....*Ethulia*.
      - ×× Pappus setaceous deciduous .....*Vernonia*.
    - β. Head collected into a head-like cluster.....*Elephantopus*.
  - b. Heads homogamous, flowers tubuliformed, never yellow; anther truncate at the base; style-branches subterete, obtuse, shortly papillose .....Eupatorieæ.
    - α. Anthers not appendiculate.....*Adenostemma*.
    - β. Anthers appendiculate.
      - Pappus scaly .....*Ageratum*.
      - Pappus setaceous.
        - Involucral bracts 6 or more than 6.....*Eupatorium*.
        - Involucral bracts 4, sometimes with small scales at the base.....*Mikania*.
  - c. Heads heterogamous liguli- or tubuliformed or, ray-flowers being wanted, homogamous; anthers obtuse at the base, subentire. Style-branches complanate, appendiculate.....Astereæ.

- $\alpha$ . Heads with ligulate marginal flowers; margin-flowers same colored as disc-flowers.....*Solidago*.  
 $\beta$ . Heads with 2— $\infty$ —series of  $\varphi$ . with ligulate or filiformed corolla; pappus short or 0.  
     Fruit crowned with a cup.....*Grangea*.  
     Fruit not crowned with a cup.....*Dichrocephala*.  
 $\gamma$ . Heads with ligulate margin-flowers, whose colour is different from that of disc-flowers.  
     Pappus reduced or 0.  
     Fruit without sticky ring at the apex...*Lagenophora*.  
     Fruit with a sticky ring at the apex.....*Myriactis*.  
     Pappus setaceous or in *A. indicus* nearly reduced.  
     Involucral bracts more than 2-series; ray-flowers in 1-series, lanceolate; appendage of style-branches lanceolate .....*Aster*.  
     Involucral bracts nearly 2-series, ray-flowers linear in many series; appendage of style-branches mostly short, triangular .....*Erigeron*.  
 $\delta$ . Heads with filiformed or short ligulate margin-flowers.  
     Pappus  $\infty$  setaceous.  
     Fruit not compressed .....*Microglossa*.  
     Fruit compressed.....*Conyza*.  
 $d$ . Heads homogamous or heterogamous, the outer ligulate. Anther-cells (except *Laggera*) tailed. Style various.....*Inuleæ*.  
     1.  $\varphi$  flowers filiformed.  
         1. Styles of  $\varphi$  flowers with thoroughly hairy branches.  
             Heads simple, not collected into a head-like cluster.  
                  $\alpha$ . Pappus-setæ  $\infty$ .  
                     Herb with narrow involucral bracts.  
                         Anther tailed .....*Blumea*.  
                         Anther not tailed .....*Laggera*.  
                     Shrubs with wide involucral bracts. *Pluchea*.  
                  $\beta$ . Pappus 0 .....*Epaltes*.



- Heads collected into a head-like cluster...*Sphaeranthus*.
2. Styles of ♀ flowers mostly truncate at the apex and furnished with a terminal crown of hairs.
- α. ♀ flowers all sterile.
- Pappus-setae deciduous connate at the base...  
.....*Leontopodium*.
- Pappus-setae free at the base.....*Anaphalis*.
- β. ♀ flowers all fertile .....*Gnaphalium*.
- II. ♀ flowers ligulate .....*Carpesium*.
- e. Heads homogamous or heterogamous. Style-branches with a crown of longer hairs. Anthers rounded at the base.
- α. Pappus not hair-like.
- I. Involucral bracts without scarious blades.
- Receptacles with paleae .....*Heliantheae*.
- Corolla of ♀ 0. Heads unisexual ...*Xanthium*.
- Corolla advanced.
- Fruit not compressed.
- Inner involucral bracts concave embracing the marginal fruits. Pappus 0 .....  
.....*Siegesbeckia*.
- Inner involucral bracts flat.
- Palea very narrow .....*Eclipta*.
- Palea wide.
- Margin flowers ♀ .....*Wedelia*.
- Margin flowers neutral.....*Helianthus*.
- Fruit dorsally compressed.
- \* Setae with retrorse hairs.
- Leaves alternate .....*Glossogyne*.
- Leaves opposite .....*Bidens*.
- \*\* Setae without retrorse hairs...*Synedrella*.
- Receptacles without palea.....*Tagetes*.
- II. Involucral bracts with scarious blades at the margin and apex. Pappus 0 or reduced.....*Anthemideae*.

- Heads with ray-flowers which are longer than involueral bracts ..... *Chrysanthemum*.  
 Heads heterogamous, flowers all disciformed.  
   ♂ flowers tetramerous.  
     Flower-heads stalked ..... *Cotula*.  
     Flower-heads sessile *Centipida* (*Myriogyne*)  
   ♂ flowers pentamerous.  
     Fruit not 5-costate; ♀ 1-seried. *Artemisia*.  
     Fruit 5-costate; ♀ 2-seried. *Crossostephium*.
3. Pappus hair-like ..... *Senecioneæ*.  
   Heads homogamous. Style-branches with long acute appendage at the apex of the stigmatic line, without distinct crown of long hairs ..... *Gynula*.  
   Heads homogamous or heterogamous; style-branches with a crown of hairs at the apex.  
     Heads homogamous ..... *Cacalia*.  
     Heads heterogamous, involueral bracts more than six which are not at all or very slightly imbricate.  
       ..... *Senecio*.  
     Heads heterogamous, involueral bracts more than 6 which are strongly imbricate ..... *Ligularia*.
7. Heads with ♀ at the margin mostly sterile ray-formed, disc-flowers with unbranched style; anthers acuminate at the base. Receptacles without palea..... *Calendulææ*.
- g. Style thickened or furnished with a crown of hairs at the base of furcation ..... *Cynareæ*.  
   Heads 1-flowered, collected into a head-like cluster..... *Echinops*.  
   Heads many-flowered, simple.  
     Filaments naked ..... *Saussurea*.  
     Filaments verrucose, hairy or ciliate ..... *Cirsium*.
- h. Heads homogamous or heterogamous. Margin-flowers, if exist, 2-lipped; disc-flowers ray-formed, with deep-cleft limb or 2-lipped.  
   ..... *Mutisieæ*.

- Upper lip of corolla 0, lower lip 5-lobed ..... *Ainsliea*.  
 Upper lip of corolla 2-, lower lip 4 or 3-lobed..... *Gerbera*.  
 B. Plant with milky juice; corolla all ligulate ..... **LIGULIFLORÆ**.  
   Pappus-setæ feathery ..... *Picris*.  
   Pappus-setæ simply hairy, rough or smooth.  
     Achene rostrate.  
       Scape erect, 1-headed ..... *Taraxacum*.  
       Head paniculate or racemose ..... *Lactuca*.  
     Achene not rostrate.  
       Achene narrowed at the apex..... *Crepis*.  
       Achene truncate at the apex.  
         Fruit complanate..... *Sonchus*.  
         Fruit terete..... *Hieracium*.

***Ethulia* LINN.**

***Ethulia conyzoides* LINN.;** HAYATA Gen. Ind. Fl. Formos. p. 39.

The occurrence of this species in the island is rather doubtful.

***Vernonia* SCHREB.**

*Key to species.*

1. Pappus very short or nearly none ..... 1. *V. Kawakamii*.  
   Pappus-setæ copious..... 2.
2. Trailing plant ..... 2. *V. Andersoni*.  
   Erect plant..... 3.
3. Leaves whitish beneath..... 3. *V. chinensis*.  
   Leaves not whitish beneath..... 4.
4. Leaves obovate-oblong 7 cm. long 2-3 cm. broad ..... 4. *V. gratiosa*.  
   Leaves much-smaller oblong or linear 2-3 cm. long. .... 5. *V. cinerea*.

1. ***Vernonia Kawakamii* HAYATA** (Pl. IV.) Gen. Ind. Fl. Formos. p. 41.

2. ***Vernonia Andersoni* CLARKE;** HAYATA l.c. p. 41.

2—*a*. ***Vernonia Andersoni* CLARKE** var. ***albipappa* HAYATA** n. v. Scandens, rami fulvescentes dense pubescentes. Folia lanceolata vel oblanceolata 8-10 cm. longa 2-3 cm. lata apice acuta ad summum aristata basi cuneata margine



integra chartacea supra glabra subtus fulvo-pubescentia ; petiolis 5 mm. longis. Flores ut typica ; sed pappus albo-fulvescens.

HAB. Nantō : Shinnenshō, leg. Y. SHIMADA.

Differs from the type in the whitish pappus-hairs and in the less hairy corolla and styles.

3. **Vernonia chinensis** LESS.; HAYATA l.c. p. 41.

4. **Vernonia gratiosa** HANCE ; HAYATA l.c. p. 41.

5. **Vernonia cinerea** LESS.; HAYATA l.c. p. 41.

### *Elephantopus* LINN.

#### *Key to species.*

1. Head-clusters sessile spicately arranged..... 1. *E. spicata*.  
Head-clusters long pedunculate ..... 2.
2. Flowers purple ..... 2. *E. scabra*.  
Flowers white ..... 3. *E. mollis*.
1. **Elephantopus spicatus** B. JUSS.; HAYATA l.c. p. 39.
2. **Elephantopus scaber** LINN.; HAYATA l.c. p. 39.
3. **Elephantopus mollis** H.B.K.; HAYATA l.c. p. 39.

### *Adenostemma* FORST.

**Adenostemma viscosum** FORST ; HAYATA l.c. p. 37.

### *Ageratum* LINN.

**Ageratum conyzoides** LINN.; HAYATA l.c. p. 37.

### *Eupatorium* LINN.

#### *Key to species.*

1. Scandent and somewhat trailing plants..... 2.  
Erect plants ..... 3.
2. Leaves triangular-ovate deeply dentate..... 1. *E. gracillimum*.  
Leaves ovate-oblong shallowly dentate ..... 2. *E. Tashiroi*.
3. Leaves tripartite ..... 3. *E. formosanum* ; 4. *E. quasitripartitum*.  
Leaves simple ..... 4.

4. Leaves broadly ovate..... 5. *E. Reevesii*.  
 Leaves lanceolate or linear ..... 5.  
 5. Leaves lanceolate acuminate ..... 6. *E. tozanensis*.  
 Leaves linear ..... 7. *E. Lindleyanum*.

1. **Eupatorium gracillimum** HAYATA, (Pl. V.) l.c. p. 39.

2. **Eupatorium Tashiroi** HAYATA l.c. p. 39.

3. **Eupatorium formosanum** HAYATA l.c. p. 39.

4. **Eupatorium quasitripartitum** HAYATA sp. nov. Herba basi lignosa scandens vel erecta tenuiter hirsuta ramosa. Folia oblonga vel trilobata 7-8 cm. longa 3-5 cm. lata apice acuminata vel obtusa basi acuta vel truncata margine serrata, serris obtusis, utraque pagine tenuiter hirsuta vel subglabrata, petiolis 7-10 mm. longis. Capitula dense cymosa ramosissima, pedicellis ultimis 1-2 mm. longis hirsutis, bracteolis 2-3 instructis. Involucri bracteae 2-3-seriatim dispositae, interioribus longioribus spathulatis 3-4 mm. longis 1 mm. latis apice rotundatis basi attenuatis glabris. Flores 5-6. Achænium pentagonum in sectione 5-costatum ad costas hirsutum nigricans; pappi setae 2-3 mm. longae scabrae subalbæ. Corolla tubuloso-campanulata 3-3½ mm. longa 1-1½ mm. lata glabra apice 5-lobata, lobis breve triangularibus ½ mm. longis; styli ramis longe exsertis.

HAB. Hokuto, Taihoku, Tamsui, Kelung, Kussaku.

Near *E. formosanum* HAY., but differs from it in having much obtuser trilobed leaves.

5. **Eupatorium Reevesii** WALL.; HAYATA l.c. p. 39.

HAB. inter Seisui et Guukutsu, leg. B. HAYATA et S. SASAKI, Mai. 1917; Tannō, leg. B. HAYATA.

NOTE: Leaves fleshy lusterless above; involucre green; styles and corolla white.

6. **Eupatorium tozanense** HAYATA sp. nov. Herba basi lignosa erecta subglabra. Folia lanceolata 16 cm. longa 4 cm. lata apice acuminata vel acuminatissima, acuminibus linearibus, basi obtusa margine grosse serrata membranacea utraque pagine hirsuta, petiolis 8-10 mm. longis. Capitula dense cymosa, pedicellis dense fulvo-hirsutis, bracteolis minutis lanceolatis multis instructis. Involucrum anguste conico-campanulatum 5 mm. longum; bracteis involuceri 3-seriatim dispositis, interioribus longioribus linearibus vel lanceolatis

5-6 mm. longis apice obtusissimis pauce hirsutis. Flores 6-7. Ovarium cylindricum  $2\frac{1}{2}$  mm. longum apice truncatum basi obtusum subglabrum. Pappi setæ copiosæ  $3\frac{1}{2}$  mm. longae scabrae. Corolla tubulosa apice plus minus latior 4 mm. longa extus medio pauce hirsuta apice 5-lobata, lobis oblongo-triangularibus; styli ramis longe exsertis. Achænium maturum ignotum.

HAB. Arisan: Tōzan, leg. T. SŌMA.

Near *E. Lindleyanum*; but differs from it in the much broader leaves.

7. **Eupatorium Lindleyanum** DC.; HAYATA l.c. p. 39.

*Mikania* WILLD.

**Mikania scandens** WILLD.; HAYATA l. c. p. 40.

*Solidago* LINN.

**Solidago Virga-aurea** LINN.; HAYATA l. c. p. 41.

*Grangea* ADANS.

**Grangea maderaspatana** POIR.; HAYATA l. c. p. 39.

*Dichrocephala* DC.

**Dichrocephala latifolia** DC.; HAYATA l. c. p. 39.

*Lagenophora* CASS.

**Lagenophora Billardieri** CASS.; HAYATA l. c. p. 40.

*Myriactis*

**Myriactis longipedunculata** HAYATA (Pl. VI.) l. c. p. 40.

*Aster* LINN.

*Conspectus of species.*

- |    |   |                          |
|----|---|--------------------------|
| 1. | Pappus none or very much reduced .....                          | 1. <i>A. indicus</i> .   |
|    | Pappus copious .....  | 2.                       |
| 2. | Leaves cordately oblong or cordate .....                        | 2. <i>A. formosana</i> . |
|    | Leaves linear margin entire .....                               | 3.                       |
|    | Leaves oblong lanceolate more or less serrate never entire..... | 6.                       |
| 3. | Leaves ciliate at the margin .....                              | 4.                       |



- Leaves not ciliate at the margin .....5.
4. Leaves ciliate at the margin, but glabrous on both sides...3. *A. Oldhami*.  
 Leaves hirsute on both sides .....4. *A. omerophyllus*.
5. Pappus reddish, stronger than in the following species...5. *A. rufopappus*.  
 Pappus brownish .....6. *A. batakensis*.
6. Involucral bracts 1-2-seriate, nearly equal .....7. *A. morrisonensis*.  
 Involucral bracts 3-4-seriate, very unequal.....7.
7. Leaves oblong scabrous gradually passing into bract-like small leaves in the  
 inflorescence, pappus-hairs stronger than in the other species.....  
 8. *A. baccharoides*.
- Leaves various villose or glabrous, scabrous or smooth; inflorescence with-  
 out bract-like small leaves. Pappus different from the preceding species  
 in the anatomical characters .....8.
8. Branches and leaves all brownish villose.....9. *A. lasioclada*.  
 Branches and leaves not villose .....9.
9. Leaves very scabrous; cymes terminal, much contracted; heads nearly  
 clustered .....10. *A. scaberrimus*.  
 Leaves glabrous or slightly hairy, sometimes slightly scabrous; cymes  
 usually expanded.....11. *A. trinervius*.  
 (Branches scandent or hanging.....12. *var. scandens*.)

1. **Aster indicus** LINN.; HAYATA l.c. p. 37.

2. **Aster formosana** HAYATA sp. nov. Caulis 60-80 cm. longus subglaber. Folia triangulari-ovata 14 cm. longa 9 cm. lata apice cuspidato-acuminata basi leviter cordata vel truncato-cordata margine grosse dentata, dentibus triangularibus apice setulosis, basi et cuspidate integra, utraque pagine glabra subtus pallidissima, petiolis 7 cm. longis. Capitula paniculata, paniculis 14 cm. longis 9-10 cm. latis, capitula cum fl. marginalibus 1 cm. in diametro, bracteis involucri 2-seriatim dispositis, interioribus linearibus  $4\frac{1}{2}$  mm. longis 1 mm. latis apice obtusis. Fl. ♀: marginales liguliformes 1-seriatim dispositi; ovarium hirsutum; pappi setæ copiosæ 2-3 mm. longæ; corollæ tubo 2 mm. longo, limbo liguliformi lineari  $5\frac{1}{2}$  mm. longo  $1\frac{1}{3}$  mm. lato apice obtuso basi attenuato. Fl. disci ♂: corollæ tubo 2-3 mm. longo extus breve hirsuto, limbo fere 5-partito, partibus linearibus  $3\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis valde recurvis.

*Achænium* ignotum.

*Aster scabra* HAYATA (non THUNB.) Gen. Ind. p. 37.

Differs from *Aster scabra* by the anatomical characters of the pappus-hairs and by the leaf-base which is not at all decurrent to the petiole.

3. ***Aster Oldhami*** HEMSL. (Fig. 26-5); HAYATA, l.c. p. 37.

4. ***Aster omerophyllus*** HAYATA sp. nov. (Fig. 26-6). Annua; caulis erectus 30-40 cm. longus toto longitudine foliatus setuloso-hirsutus ramosus. Folia basalia lineari-spathulata 6 cm. longa 6 mm. lata apice obtusa basi longe attenuata margine subintegra utraque pagine setuloso-hirsuta margine ciliolata. Folia superiora linearia 3 cm. longa 2 mm. lata sessilia. Capitula ad ramos terminalia cum floribus marginalibus 3 cm. in diametro, bracteis involucri 1-2-seriatim dispositis linearibus 7 mm. longis 1 mm. latis margine et dorso setoso-hirsutis apice acutis. Fl. ♀ marginales liguliformes 1-seriatim dispositi; pappi setæ 0; corollæ tubo 1½ mm. longo, limbo oblanceolata 1 cm. longo 2½ mm. lato apice obtuso obscure 3-dentato. Fl. disci. ♂: ovarium dense hirsutum; pappi setæ copiosæ 1-seriatim sitæ 3-4 mm. longæ scabræ; corolla tubuloso-campanulata 4 mm. longa extus plus minus hirsuta apice 5-lobata, lobis oblongo-triangularibus 1 mm. longis. Achænium maturum ignotum.

HAB. inter Taroko et Shinjō, leg. B. HAYATA, Aprili. 1917.

Near *Aster Oldhami* HEMSL.; but differs from it by the leaves, hirsute at the margin and on both surfaces.

5. ***Aster rufopappus*** HAYATA sp. nov. (Fig. 26-3) Annua. Caulis erectus 50-60 cm. altus ramosus toto longitudine foliatus subglaber. Folia linearia vel spathulata 3 cm. longa 3-4 mm. lata apice obtusa vel acuta basi attenuata sessilia margine integra utraque pagine breve hirsuta, pilis validis. Capitula ad apicem ramulorum sita cum floribus marginalibus 2 cm. in diametro. Involucri bracteæ lineares 2-seriatim dispositæ hirsutæ lineares 7 mm. longæ 1 mm. latæ apice acuminatissimæ extus dense hirsutæ intus glabræ. Fl. ♀ marginales liguliformes 1-seriatim dispositi; ovario dense hirsuto; pappo paleiformi gamophyllo ½ mm. longo; corollæ tubus 2 mm. longus, limbo liguliformi lanceolato 1 cm. longo 2½ mm. lato apice basique obtuso. Fl. disci. ♂: ovarium obovoideum dense hirsutum 1 mm. longum; pappi setæ copiosæ rubescentes 3-4 mm. longæ; corollæ tubuloso-campanulatæ 5 mm. longæ, limbo 5-partito.

Achaenium valde complanatum obovatum  $2\frac{1}{2}$  mm. longum  $1\frac{2}{3}$  mm. latum hirsutum. Pappi setae rubescentes 4 mm. longae.

HAB. Sansaho.

*Aster altaicus* HAYATA (non WILLD.) Gen. Ind. p. 37.

Differs from *A. altaicus* WILLD. by the more reddish pappus of a different anatomical character.

6. ***Aster batakensis*** HAYATA sp. nov. (Fig. 26-2) Annua 50-80 cm. longa, caulis subglaber ramosus toto longitudine foliosus. Folia linearia vel spathulata 4 cm. longa 4-5 mm. lata apice obtusa vel acuta basi attenuata utraque pagine subglabra margine integra sessilia; folia superiora minora bracteiformia. Capitula ad apicem ramulorum terminalia; cum floribus marginalibus 4 cm. in diametro, involucri bracteis circ. 1-seriatim dispositis linearibus 1 cm. longis  $\frac{2}{3}$  mm. latis extus hirsutis acuminatis. Fl. ♀: marginales 1-seriatim dispositi liguliformes, tubo 2 mm. longo, limbo lanceolato 14 mm. longo  $3\frac{1}{2}$  mm. lato apice brevissime 3-dentato basi plus minus contracto; pappi paleiformes connati  $\frac{1}{2}$  mm. longi. Fl. disci. ♂: ovarium dense hirsutum; pappi setae copiosae 3 mm. longae; corolla tubuloso-campanulata 4 mm. longa apice 5-lobata, lobis triangularibus  $\frac{2}{3}$  mm. longis. Achaenium complanatum obovatum hirsutum  $2\frac{1}{2}$  mm. longum apice rotundatum basi cuneatum; pappi setae copiosae scabrae 2-3 mm. longae.

HAB. inter Shinjō et Batakan, leg. B. HAYATA et S. SASAKI Aprili. 1917.

Near *A. rufopappus* HAY.; but differs from it by the brownish pappus-hairs.

7. ***Aster morrisonensis*** HAYATA sp. nov. Caulis 20-30 cm. longus simplex gracilis glaber toto longitudine foliatus. Folia lanceolata membranacea 6 cm. longa 1 cm. lata apice acuminata basi attenuata margine remote serrata supra minute hirsuta subtus ad nervos hirsuta subsessilia. Capitula cymose disposita, cymis 3-4 cm. longis totiusque latis; bracteis involucri 2-seriatim dispositis, interioribus linearibus 3 mm. longis  $\frac{2}{3}$  mm. latis margine dorsoque barbato-ciliolatis apice obtusissimis. Fl. ♀: marginales 1-seriatim dispositi. pappi setae  $2\frac{1}{2}$  mm. longae scabrae; corollae tubus  $1\frac{1}{3}$  mm. longus, limbo liguliformi lanceolato 6 mm. longo  $1\frac{1}{2}$  mm. lato apice obtusissimo 3-crenulato. Fl. disci. ♂: corollae tubuloso-campanulatae, tubo  $1\frac{1}{2}$  mm. longo, limbo  $1\frac{1}{2}$  mm.



longo a medio sursum 5-lobato, lobis elongato-triangularibus 1 mm. longis. Achænium maturum ignotum.

HAB. Monte Morrison, ad 11000 ped. alt.; leg. S. SASAKI, Oct. 1909.

Near *A. trinervius*; but differs from it by the very much slender form with very much smaller lanceolate leaves.

8. **Aster baccharoides** STEETZ. (Fig. 26-5); HAYATA l.c. p. 37.

9. **Aster lasioclada** HAYATA (Fig. 26-1) sp. nov. Caulis molle fulvo-tomentosus simplex vel ramosus. Folia ovato-oblonga 6 cm. longa  $2\frac{1}{2}$  cm. lata apice obtusa ad summum mucronata basi acuta vel obtusa utraque pagine fulvo-velutinoso-tomentosa margine subintegra vel remote mucronibus instructa, petiolis 5 mm. longis velutinoso-tomentosis. Capitula laxe cymosa, bracteis involucri interioribus linearibus 5 mm. longis  $\frac{2}{3}$  mm. latis apice acuminatis basi attenuatis. Capitula cum floribus marginalibus  $1\frac{1}{2}$  cm. in diametro. Fl. ♀: marginales liguliformes 1-2 seriatim dispositi; corollæ tubus 3 mm. longus, limbo liguliformi lanceolato 7 mm. longo  $1\frac{2}{3}$  mm. lato apice obtuso. Fl. disci. ♂: ovarium hirsutum; pappi setæ 5 mm. longæ scabræ; corolla tubuloso-campanulata  $4\frac{1}{2}$  mm. longa, tubo 2 mm. longo, limbo  $2\frac{1}{2}$  mm. longo apice 5-lobato, lobis lineari-triangularibus  $1\frac{1}{2}$  mm. longis. Achænium maturum ignotum.

HAB. Nantō: Kashigatani, leg. G. NAKAHARA, Feb. 1907; inter Holisha et Suisha.

Near *Aster trinervius*, but differs from it by the soft tomentose leaves and branches.

10. **Aster scaberrimus** HAYATA sp. nov. Caulis subsimplex 40-60 cm. altus scaber toto longitudine foliatus. Folia oblongo-lanceolata vel oblanceolata 7 cm. longa 2 cm. lata apice acuminata obtusa vel acuta basi attenuata subsessilia margine serrata supra scaberrima subtus scabra plus minus hirsuta. Capitula dense cymosa, cymis terminalibus 2 cm. longis totiusque latis. Capitula cum floribus marginalibus 7-8 mm. in diametro; bracteis involucri imbricatis 3-seriatim dispositis, interioribus spathulatis  $3\frac{1}{2}$  mm. longis 1 mm. latis apice obtusissimis margine crosis extus hirsutis. Fl. ♀: marginales liguliformes 2-seriatim dispositi; ovarium hirsutum; pappi setæ 3 mm. longæ scabræ; corollæ tubus  $1\frac{1}{3}$  mm. longus, limbo liguliformi  $3\frac{1}{2}$  mm. longo  $\frac{2}{3}$  mm.

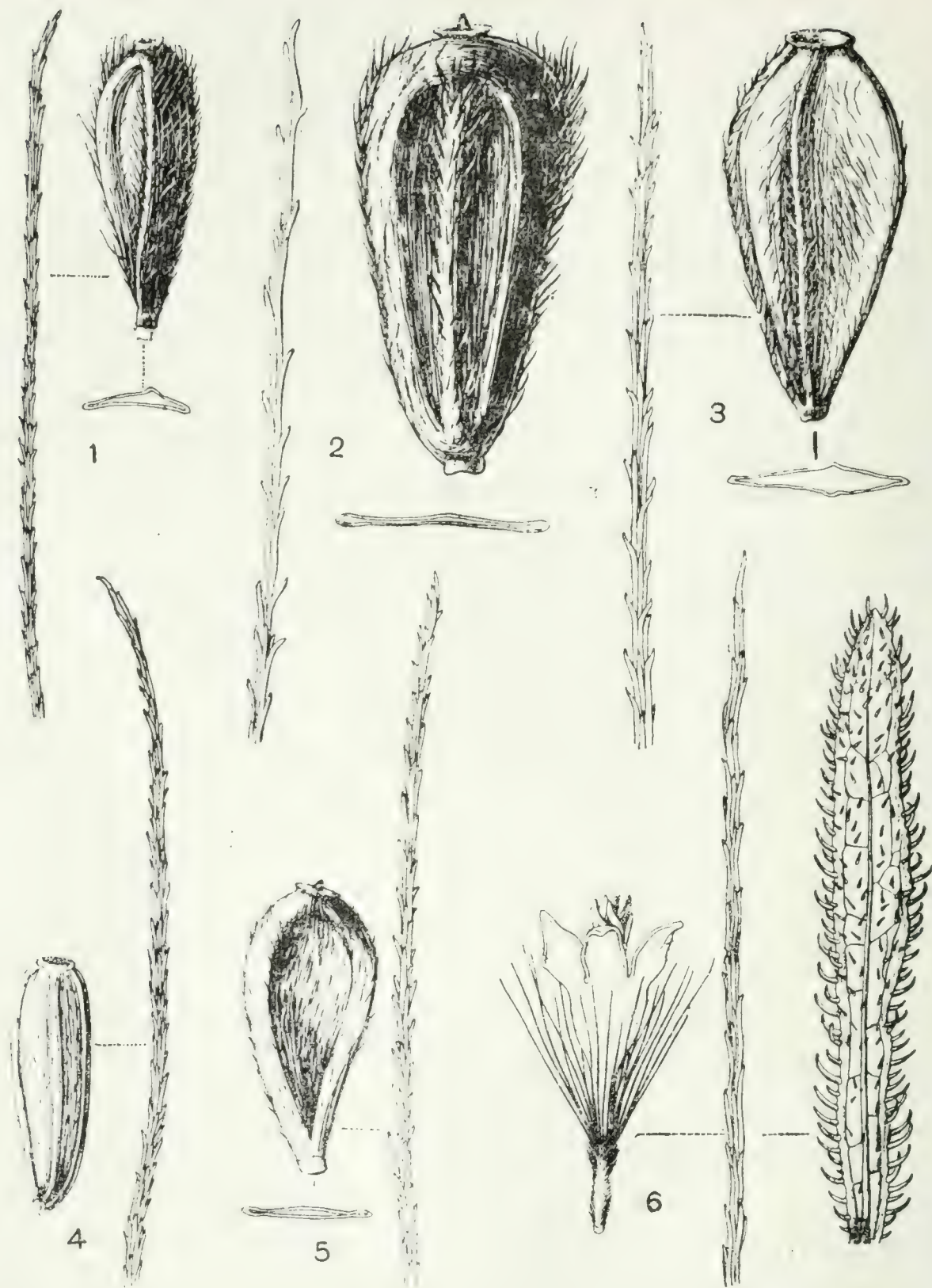


Fig. 26; 1, *Aster lasioclada* HAYATA; 2, *Asteratakensis* HAYATA; 3, *Aster rufopappus* HAYATA; 4, *Aster baccharoides*; 5, *Aster Oldhami* HEMSL.; 6, *Aster omerophyllus* HAYATA.

lato lanceolato apice truncato breve 3-crenulato denticulato. Fl. disci. ♂ : tubulosi  $3\frac{1}{2}$  mm. longi. Achænium maturum ignotum.

HAB. in Monte Morrison, leg. T. KAWAKAMI et U. MORI, Oct. 1906.

Near *Aster trinervius*, but differs from it by the much contracted cymes and by the very much scabrous leaves.

10. **Aster trinervius** ROXB.; HAYATA l.c. p. 37.

11. **Aster trinervius** ROXB. var. **scandens** HAYATA n.v.

HAB. Arisan.

### *Erigeron* LINN.

#### *Key to species.*

Stem branched. Heads many racemose or paniculate.....1. *E. linifolius*.

Stem simple not branched. Heads terminal solitary...2. *E. morrisonensis*.

1. **Erigeron linifolius** WILLD.; HAYATA l.c. p. 39.

2. **Erigeron morrisonensis** HAYATA l.c. p. 39.

### *Microglossa* DC.

**Microglossa volubilis** DC.; HAYATA l.c. p. 40.

### *Conyza* LESS.

#### *Key to species.*

Leaves deeply laciniate ..... 1. *C. ægyptiaca*.

Leaves not laciniate serrate ..... 2. *C. japonica*.

1. **Conyza ægyptiaca** AIT.; HAYATA l.c. p. 38.

2. **Conyza japonica** LESS.; HAYATA l.c. p. 38.

### *Blumea* DC.

#### *Key to species.*

1. Leaves silky or cottony beneath..... 2.

Leaves glabrous or hairy beneath, but neither silky nor cottony..... 5.

2. Leaves brown cottony beneath..... 1. *B. balsamifera*.

Leaves white silky or cottony ..... 3.

3. Stem unbranched. Head-clusters sessile ..... 4.

Stem branched. Head-clusters pedunculate..... 2. *B. hieracifolia*.



4. Head-clusters terminal ..... 3. *B. gnaphalioides*.  
 Head-clusters terminal or axillary, racemose ..... *B. sericans*.  
 5. Leaves deeply laciniate..... 5. *B. laciniata*.  
 Leaves serrate dentate, but not laciniate ..... 6.  
 6. Climbing ..... 6. *B. chinensis*.  
 Erect ..... 7.  
 7. Leaves membranaceous ..... 8.  
 Leaves chartaceous ..... 11.  
 8. Leaves dentate ..... 9.  
 Leaves irregularly serrulate..... 10.  
 9. Leaves densely hairy beneath ..... 7. *B. lacera*.  
 Leaves thinly hairy beneath ..... 8. *B. onnaensis*.  
 10. Heads 5 mm. long ..... 9. *B. okinawensis*.  
 Heads 7-8 mm. long ..... 10. *B. leptophylla*.  
 11. Heads 7 mm. long ..... 11. *B. myriocephala*.  
 Heads 10 mm. long ..... 12. *B. conspicua*

1. **Blumea balsamifera** DC.; HAYATA l.c. p. 37.

2. **Blumea hieracifolia** DC.; HAYATA l.c. p. 37.

3. **Blumea gnaphalioides** HAYATA sp. nov. Caulis simplex 30-40 cm. longus. Folia radicalia spatulata 9 cm. longa  $2\frac{1}{2}$  cm. lata apice rotundata vel obtusissima basi attenuata sessilia margine irregulariter denticulata membranacea supra hirsuta subtus argenteo-tomentosa; folia caulina minora. Capitula densissime cymosa, cymis terminalibus solitariis 2 cm. longis totiusque latis; capitula cylindrico-campanulata 5 mm. longa et lata, bracteis involucri 3-seriatim dispositis, interioribus linearibus  $5\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis denticulatis barbatis. Fl. ♀: marginales multi-seriatim dispositi filiformes  $3\frac{1}{2}$  mm. longi; stylo paullo exserto. Fl. ♂: centrales circ. 10; corolla tubulosa  $3\frac{1}{2}$  mm. longa apice breve 5-lobata, lobis rotundato-triangularibus  $\frac{1}{3}$  mm. longis margine hirsutis. Achæ-nium cylindricum  $\frac{2}{3}$  mm. longum; pappi setæ 4 mm. longae 1-seriatim dispositæ.

HAB. Yayeyama, leg. Y. TASHIRO, 1887.

Near *B. sericans* Hook. f., but differs from it by the anatomical characters of the pappus-hairs and by the capitate heads on the apex of the stem.

4. **Blumea sericans** Hook. f.; HAYATA l.c. p. 38.

5. **Blumea laciniata** DC.; HAYATA l.c. p. 38.

6. **Blumea chinensis** DC.; HAYATA l.c. p. 37.

7. **Blumea lacera** DC.; HAYATA l.c. p. 38.

8. **Blumea onnaensis** HAYATA sp. nov. Herba annua 40-50 cm. longa tenuiter hirsuta. Folia oblonga vel obovato-oblonga membranacea cum petiolis 6-8 cm. longa 3 cm. lata apice acuta basi subito ad petiolum alatum longe attenuata margine irregulariter dentata utraque pagine tenuiter hirsuta subsessilia. Capitula racemosa vel paniculata cylindrico-globosa 7 mm. longa totiusque lata, bracteis involucri 5-6-seriatim dispositis, interioribus linearibus 6 mm. longis  $\frac{2}{3}$  mm. latis extus hirsutis apice barbatis acutis vel obtusis 1-costatis leviter purpureis. Fl. ♀: multi-seriatim dispositi; corolla filiformis  $3\frac{1}{2}$  mm. longa apice truncata; pappi setae albæ 1-seriatim dispositæ 4 mm. longæ scabræ. Fl. ♂: centrales circ. 20; corollæ tubuloso-filiformes  $4\frac{1}{2}$  mm. longæ  $\frac{1}{2}$  mm. latæ apice 5-lobatæ, lobis oblongo-triangularibus  $\frac{1}{2}$  mm. longis margine hirsutis. Achænium maturum ignotum.

HAB. Loo-choo: Onna.

9. **Blumea okinawensis** HAYATA sp. nov. Herba annua 30-40 cm. alta erecta haud vel pauce ramosa. Folia radicalia vel caulina membranacea, inferiora obovato-oblonga 12 cm. longa  $5\frac{1}{2}$  cm. lata apice acuta vel obtusa basi gradatim attenuata subsessilia ad petiolum subnullum abeuntia margine irregulariter denticulata membranacea utraque pagine tenuissime hirsuta; caulina minora. Capitula cymosa vel paniculata, pedicellis ultimis 5 mm. longis hirsutis; capitula cylindrico-globosa 7 mm. longa totiusque lata; involucri bracteis multi-seriatim dispositis, exterioribus brevioribus triangularibus, interioribus linearibus 5 mm. longis 1 mm. latis apice triangulari-acutis extus dorso margineque hirsutis. Fl. ♀: marginales  $\infty$ -seriatim dispositi; ovarium cylindricum hirsutum  $\frac{2}{3}$  mm. longum; pappi setae 1-seriatim dispositæ  $2\frac{1}{2}$  mm. longæ albæ scabræ; corolla filiformis 2 mm. longa. Fl. ♂: corolla tubuliformis 2 mm. longa  $\frac{1}{4}$  mm. lata apice 5-lobata, lobis oblongo-triangularibus  $\frac{1}{5}$  mm. longis. Achænium ignotum.

HAB. Loo-choo: Naha, leg. Y. TASHIRO, mai. 1887.

Near *Blumea lacera* DC.; but differs from it by the leaves with attenuate base.

10. **Blumea leptophylla** HAYATA sp. nov. Herba suffrutescens 50-60 cm. longa hirsuta obovato-oblonga vel oblanceolata 10-20 cm. longa 3-7 cm. lata apice acuta basi longe attenuata ad petiolum subnullum abeuntia margine irregulariter denticulata mucronibus remote instructa tenuiter membranacea utraque pagine tenuiter hirsuta. Capitula paniculata, paniculis 10-20 cm. longis, pedicellis 1 cm. longis hirsutis; capitula cylindrico-globosa 1 cm. longa et lata; bracteis involucri 3-4-seriatim dispositis exterioribus brevioribus interioribus lineari-lanceolatis 6 mm. longis acuminatis extus breve glanduloso-hirsutis. Fl. ♀: marginales multi-seriatim dispositi; corolla filiformes  $4\frac{1}{2}$  cm. longa; pappi setae 5-6 mm. longae corollas superantes. Fl. ♂: centrales 15-20; corolla tubuliformis 5 mm. longa  $\frac{1}{2}$  mm. lata apice 5-lobata, lobis oblongis obtusis glanduloso-hirsutis. Achænium maturum ignotum.

HAB. Shintiku, Goshizan, leg. U. MORI, Jan. 1907, (typus); Karapin, leg. B. HAYATA, Jan. 1912.

Near *Blumea lacera* DC.; but differs from it in having much thinner leaves covered with short glandular hairs.

11. **Blumea myriocephala** DC.; HAYATA l.c. p. 38.

12. **Blumea conspicua** HAYATA l.c. p. 38.

### *Laggera* SCH.-BIP.

**Laggera angustifolia** HAYATA sp. nov. *L. alata* HAYATA (non SCH. BIP.) Gen. Ind. p. 40. Caulis basi lignosus 50-60 cm. longus rectus erectus simplex toto foliatus anguste alatus. Folia lineari-spathulata 8 cm. longa 1 cm. lata margine mucronibus remote instructa apice acuta basi longissime attenuata ad alam caulis decurrentia utraque pagine brevissime hirsuta. Capitula ad folia superiora axillaria solitaria pedunculata nutantia, pedunculis plus minus alatis dense brevissime fulvo-hirsutis medio bracteis singulis lanceolatis instructis. Involucrum late globosum cum floribus 1 cm. longum totiuque latum; bracteis ∞-seriatim dispositis, exterioribus brevioribus 1-3 mm. longis triangularibus lanceolatis linearibus extus hirsutis apice obtusis vel acutis, interioribus longioribus linearibus minus hirsutis apice acuminatissimis 1 cm. longis. Fl. ♀: marginales; multi-seriatim dispositi; ovarium 1 mm. longum cylindricum hirsutum; pappi setae 5 mm. longae subalbæ scabræ; corolla filifor-



mis 5 mm. longa apice 3-lobata glabra. Fl. ♀ : centrales 15-20 ; corolla 7 mm. longa  $\frac{1}{2}$  mm. lata apice 5-lobata, lobis elongato-triangularibus  $\frac{1}{2}$  mm. longis acutis. Achænium ignotum.

HAB. Nantō ; Niitakayama.

Near *Laggera alata* SCH.-BIP.; but differs from it in the much narrower linear leaves.

*Pluchea* CASS.

*Pluchea indica* LESS.; HAYATA l.c. p. 40.

*Epaltes* CASS.

*Epaltes australis* LESS.; HAYATA l.c. p. 39.

*Sphaeranthus* LINN.

*Sphaeranthus suberiflorus* HAYATA sp. nov. (Pl. VII. et Fig. 27) Herba lignosa ramosissima, ramis toto foliatis alatis. Folia obovata 3-3 $\frac{1}{2}$  cm. longa

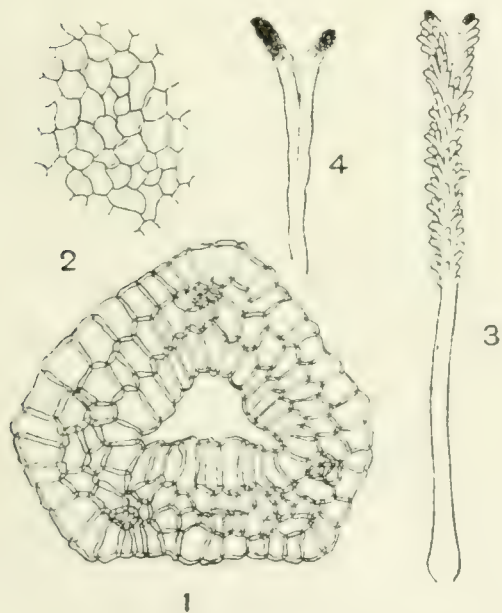


Fig. 27, *Sphaeranthus suberiflorus* HAYATA; 1, transverse section of a suberiferous portion of a corolla of a female flower; 2, a portion of the same, seen from surface; 3, a style of a ♂ flower; 4, a style of a female flower.

1 $\frac{1}{2}$ -2 cm. lata apice obtusissima vel ad summum mucronata basi attenuata longe ad alam ramorum attingentia margine brevissime serrulata utraque pagine breve hirsuta. Capitula in glomerulum globosum aggregata glomerulo 5-6 mm. in diametro pedunculato, pedunculo 5 mm. longo oppositifolio; receptaculum glomeruli globosum 2 mm. in diametro; capitulum fere sessile vel brevissime pedicellatum, pedicellis  $\frac{1}{2}$  mm. longis, obconico-semiglobosum 2 mm. longum totiusque latum basi bracteolis minutis 1-2 instructum, bracteis involucri 1-seriatim dispositis obovato-spathulatis 2 mm. longis  $\frac{2}{3}$  mm. latis apice truncatis et denticulatis ad centrum mucronatis glabris. Fl. ♀ : marginales 2-3 seriatim dispositi; ovarium obovoideo-

cylindricum  $\frac{3}{4}$  mm. longum  $\frac{1}{4}$  mm. latum ferrugineo-hirsutum; pappi 0; corolla

cylindrica  $1\frac{1}{4}$  mm. longa a basi usque ad medium suberifera dilatata  $\frac{1}{3}$  mm. lata apice contracta, partibus contractis  $\frac{1}{2}$  mm. longis  $\frac{1}{5}$  mm. latis glabris. Fl. ♂ : centrales 2 vel 1; corolla glabra; tubo  $\frac{2}{3}$  mm. longo  $\frac{1}{2}$  mm. lato, limbo 1 mm. longo  $\frac{1}{2}$  mm. lato apice 5-lobato, lobis oblongo-triangularibus  $\frac{1}{2}$  mm. longis. Achænium maturum ignotum.

HAB. Shōliūkiūtō, leg. G. NAKAHARA.

Near *Sphceranthus africanus*, but differs from it by the quite obtuse leaves, by the corky tubes of both ♀ and ♂ flowers, and in the branched stigma of the ♂-flowers.

*Leontopodium* BR.

**Leontopodium microphyllum** HAYATA l.c. p. 40.

*Anaphalis* DC.

*Key to species.*

1. Leaves linear, acute at the apex .....1. *A. morrisonicola*.  
    Leaves spatulate, obtuse at the apex .....2.
2. Heads less than 5 mm. long .....2. *A. buisanensis*.  
    Heads 10 mm. long .....3. *A. Nagasawai*.

1. **Anaphalis morrisonicola** HAYATA sp. nov. Perennis basi lignosa 14 cm. longa ramosa. Folia linearia 2 cm. longa 2 mm. lata apice obtusa basi attenuata integra supra glabra subtus dense adpresse sericeo-lanata sessilia apice obtusa basi attenuata. Capitula laxa cymosa late semi-globosa 7–8 mm. in diametro. Involucrum semi-globosum 7 mm. in diametro, bracteis multi-seriatim dispositis, exterioribus minoribus ovatis, interioribus majoribus obovatis 4 mm. longis 2 mm. latis apice obtusis basi cuneatis albis integris glabris, intimis angustioribus spatulatis 3 mm. longis 1 mm. latis apice obtusis basi cuneatis glabris. Fl. ♀ : ignoti. Flores in specimine nostro omnes ♂ steriles; corolla tubulosa apice campanulata dilatata 3 mm. longa  $1\frac{1}{2}$  mm. lata apice 5-lobata, lobis triangularibus; pappi setæ albæ deciduæ scabræ apice plus minus clavatæ.

HAB. Mt. Morrison.

Distinguishable from *A. margaritacea* var. *angustifolia* by the anatomical structure of the pappus-hairs.

2. **Anaphalis buisanensis** HAYATA sp. nov. Perennis 10 cm. alta ramosa sericeo-lanata. Folia spathulata 22 mm. longa 5 mm. lata apice acuta basi attenuata sessilia supra sparse subtus dense sericeo-lanata; folia caulina superiora linearia 1 cm. longa 2 mm. lata. Capitula laxe cymosa. Involuerum late obconico-campanulatum 5 mm. longum 7 mm. latum, bracteis 3-4-seriatim sitis, exterioribus brevioribus ovatis, interioribus obovato-spathulatis 4 mm. longis  $1\frac{1}{3}$  mm. latis apice acutis ad summum obtusis basi plus minus attenuatis albicantibus, intimis angustioribus linearibus 3 mm. longis  $\frac{1}{3}$  mm. latis apice acutis basi attenuatis. Fl. ♀ : ∞; corolla filiformis  $2\frac{1}{2}$  mm. longa. Achænium maturum ignotum. Pappi setæ copiosæ albæ scabræ  $2\frac{1}{2}$  mm. longæ.

HAB. Buyesan.

3. **Anaphalis Nagasawai** HAYATA l.c. p. 37.

### *Gnaphalium* LINN.

#### *Key to species.*

1. Head-clusters solitary terminal on the scape-like stem, or axillary, sessile, or spicate.....2.
- Head-clusters at the apex of the branches of the stem or in contracted cymes .....5.
2. Leaves nearly radical, scape nearly leafless. Head-clusters terminal solitary. .... 1. *G. japonicum*.
- Stem leafy up to the apex .....3.
3. Head-clusters terminal or axillary spicately arranged .....4.
- Head-clusters solitary terminal; leaves linear .....2. *G. lineare*.
4. Leaves linear .....3. *G. Morii*.
- Leaves spathulate .....4. *G. indicum*.
5. Heads pedunculate, not clustered.....5. *G. nitakayamensis*.
- Heads clustered or densely cymose .....6.
6. Leaves linear usually glabrous above, but cottony below....6. *G. hypoleucum*.
- Leaves spathulate or linear, densely hairy on both sides .....7.
7. Leaves spathulate .....7. *G. formosanum*.
- Leaves linear .....8. *G. hololeucum*.



1. **Gnaphalium japonicum** THUNB.; HAYATA l.c. p. 39.

2. **Gnaphalium lineare** HAYATA l.c. p. 39.

3. **Gnaphalium Morii** HAYATA sp. nov. Annuæ; caulis erectus 40 cm. altus albo-lanatus toto foliatus. Folia linearia 4-5 cm. longa 3-4 mm. lata apice acuta basi attenuata sessilia integra supra glabra subtus dense albo-lanata. Capitula ad axillas foliorum superiorum dense aggregata; capitula ipsa minuta cylindrica 3 mm. longa 2 mm. lata, bracteis 1-seriatim dispositis linearibus glabris 3 mm. longis  $\frac{1}{2}$ - $\frac{1}{3}$  mm. latis hyalinis apice obtusis basi lana alba dense obtectis. Fl. ♀: marginales ∞-seriatim dispositi; corolla filiformis  $2\frac{1}{2}$  mm. longa. Fl. ♂: centrales solitarii: corolla  $2\frac{1}{2}$  mm. longa  $\frac{1}{4}$  mm. lata tubulosa apice 5-lobata, lobis acutis. Achænium maturum obovoideum plus minus recurvum  $\frac{2}{3}$  mm. longum pauce minute punctatum; pappi setæ albæ scabræ  $2\frac{1}{2}$  mm. longæ.

HAB. Kappanzan, Tandaisha, Taroko, leg. U. MORI.

Resembles *G. indicum* in its inflorescence, but differs from it in the linear acute leaves.

4. **Gnaphalium indicum** LINN.; HAYATA l.c. p. 39.

5. **Gnaphalium niitakayamense** HAYATA l.c. p. 39.

6. **Gnaphalium hypoleucum** DC., HAYATA l.c. p. 39.

7. **Gnaphalium formosanum** HAYATA sp. nov. Annuæ. Caulis 60-70 cm. longus albo-lanatus toto foliatus. Folia linearia vel spathulata vel oblanceolata  $4\frac{1}{2}$  cm. longa 9 mm. lata apice acuta vel obtusa ad summum breve apiculata basi attenuata integra utraque pagine dense vel sparse albo-lanata sessilia vel plus minus decurrentia. Capitula ad apicem ramorum dense cymosa. Involuerum semi-globosum 5 mm. longum totiusque latum, bracteis ∞-seriatim sitis exterioribus brevioribus, interioribus longioribus obovato-spathulatis  $4\frac{1}{2}$  mm. longis 2 mm. latis apice rotundatis crenulatis dorso lanuginosis, intimis linearibus 4 mm. longis 1 mm. latis apice obtusis. Fl. ♀: marginales ∞; filiformes 3 mm. longi 10-20; corolla tubuliformis 3 mm. longa. Achænium maturum ignotum; pappi setæ copiosæ subalbæ plus minus coloratæ  $2\frac{1}{2}$  mm. longæ.

*Gnaphalium luteo-album* HAYATA (non LINN.) Gen. Ind. p. 39.

HAB. Shintengai.

Near *G. multiceps*, but differs from it in the structure of the pappus-hairs.

In our specimen, fl. ♀ and fl. ♂ are nearly the same in the shape of ovary; but, a very few fertile.

8. **Gnaphalium hololeucum** HAYATA sp. nov. Caulis 20–30 cm. longus dense lanatus toto longitudine dense approximate foliatus. Folia oblanceolata-lineararia  $2\frac{1}{2}$ –3 cm. longa 3 mm. lata apice acuta basi attenuata integra utraque pagine dense albo-lanata. Capitula ad apicem caulis densissime cymosa. Involucrum semi-globosum 4 mm. longum 5–6 mm. in diametro, bracteis ∞-seriatim dispositis, exterioribus brevioribus ovatis interioribus obovato-spathulatis  $3\frac{1}{2}$  mm. longis apice obtusissimis, intimis linearibus  $3\frac{1}{2}$  mm. longis 1 mm. latis apice obtusissimis apice crenulatis flavissimis. Fl. ♀ : marginales ∞-seriatim dispositi; corolla filiformis  $2\frac{1}{2}$  mm. longa. Fl. ♂ : centrales ignoti. Achæ-nium ignotum; pappi setæ 2 mm. longæ albæ subflavescentes.

HAB. Dorayen, leg. Y. SHIMADA, Dec. 1909.

Near *G. hypoleucum*, but differs from it in having leaves densely lanate on both sides.

### *Carpesium* LINN.

**Carpesium abrotanoides** LINN.; HAYATA l.c. p. 38.

**Carpesium acutum** HAYATA l.c. p. 38.

### *Xanthium* LINN.

**Xanthium Strumarium** LINN.; HAYATA l.c. p. 41.

### *Siegesbeckia* LINN.

**Siegesbeckia orientalis** LINN.; HAYATA l.c. p. 41.

### *Eclipta* LINN.

**Eclipta alba** HASSK.; HAYATA l.c. p. 39.

### *Wedelia* JACQ.

#### *Key to species.*

- |                                |                             |
|--------------------------------|-----------------------------|
| 1. Leaves sessile .....        | 1. <i>W. calendulacea</i> . |
| Leaves stalked.....            | 2.                          |
| 2. Leaves small, crowded ..... | 2. <i>W. prostrata</i> .    |

Leaves large on long stalks.....3. *W. biflora*.

1. **Wedelia calendulacea** LESS.; HAYATA l.c. p. 41.

2. **Wedelia prostrata** HEMSL.; HAYATA l.c. p. 41.

3. **Wedelia biflora** BENTH.; l.c. p. 41.

***Helianthus* LINN.**

**Helianthus annuus** LINN.; HAYATA l.c. p. 39.

**Helianthus tuberosus** LINN.; HAYATA l.c. p. 39.

***Glossogyne* CASS.**

**Glossogyne tenuifolia** CASS.; HAYATA l.c. p. 39.

***Bidens* LINN.**

*Key to species.*

1. Leaves pinnate or pinnatilobed .....2.  
     Leaves simple not lobed .....1. *B. Shimadai*.
2. Leaves trifid .....2. *B. tripartita*.  
     Leaves bipinnatifid or trifoliolate .....3.
3. Leaves bi-pinnatifid.....3. *B. bipinnata*.  
     Leaves 3-foliolate .....4. *B. pilosa*.

1. **Bidens Shimadai** HAYATA sp. nov. (Fig. 28). Herba suffruticosa 60 cm. longa glabra ramosa, ramis oppositis. Folia opposita lanceolata apice acuminata basi acuta margine remote serrata vel moderate serrata 6-7 cm. longa  $1\frac{1}{2}$ -2 cm. lata membranacea utraque pagine glaberrima, petiolis 5 mm.—15 mm. longis basi dilatatis. Capitula ad apicem ramorum terminalia solitaria longe pedunculata, pedunculis 3 cm. longis; capitula campanulata 5 mm. longa, bracteis involucri 2-seriatim sitis, exterioribus foliiformibus spathulatis 1 cm. longis hirsutis capitula superantibus, interioribus scariosis oblongo-lanceolatis apice obtusis 5 mm. longis  $1\frac{1}{2}$  mm. latis glabris. Flores omnes acquiformes; corolla flava, tubo  $1\frac{1}{3}$  mm. longo, limbo 1 mm. longo apice 5-lobato, lobis triangularibus  $\frac{1}{3}$  mm. longis; ovarium glabrum valde complanatum compresso-triangulare in sectione  $1\frac{1}{2}$  mm. longum 1 mm. latum.



Fig. 28,  
*Bidens*  
*Shimadai*  
HAYATA.



Achaenium longe cuneiforme 7 mm. longum  $1\frac{1}{2}$  mm. latum valde complanatum dorso medio 1-carinatum ad margines et carinas retrorse setulosum; pappi setae 2 validissimae  $4\frac{1}{2}$  mm. longae acutae trigonae ad angulos retrorse setulosae.

HAB. Shichiseizan, leg. Y. SHIMADA, Sept. 1916.

Near *B. tripartita*, but differs from it in the simple, not lobed, leaves.

2. ***Bidens tripartita*** LINN.; HEMSL. Ind. Fl. Sin. I. p. 436.

HAB. Shichiseizan, leg. T. SŌMA, Mart. 1916.

New to the flora of Formosa.

3. ***Bidens bipinnata*** LINN.; HAYATA l.c. p. 37.

4. ***Bidens pilosa*** LINN.; HAYATA l.c. p. 37.

### *Synedrella* GÆRTN.

***Synedrella nodiflora*** GÆRTN.; HOFFMANN, in Nat. Pil-fam. IV.—5, p. 212.

HAB. Akō; Nanki, leg. T. SOMA, Aug. 1915.

New to the flora of Formosa; perhaps introduced.

### *Tagetes* LINN.

***Tagetes patula*** LINN.; HAYATA l.c. p. 41.

### *Chrysanthemum* LINN.

#### *Key to species.*

1. Leaves silky white or brown beneath .....1. *C. Morii*.  
 Leaves not silky beneath .....2.
2. Leaves with petioles 7 cm. long .....2. *C. arisanensis*.  
 Leaves with petioles 1–2 cm. long .....3. *C. indicum*.

1. ***Chrysanthemum Morii*** HAYATA sp. nov. Perennis 40–50 cm. longa. Caulis gracilis sericeo-hirsutus. Folia ad apicem caulis approximativel remote disposita in ambitu obovata pinnatifida vel lacerata vel pinnatiloba, lobis linearibus vel triangularibus acutis, supra subglabra subtus adpresse-sericeo-argenteo-tomentosa basi cuneata, petiolis 5 mm. longis vel nullis. Capitula solitaria terminalia semigloboso-campanulata cum floribus marginalibus 3 cm. in diametro, bracteis involucri 3–4 seriatim dispositis, exterioribus linearibus 6 mm. longis obtusis extus dense sericeo-tomentosis intus glabris, interioribus scariosis tenuibus linearibus hyalinis 1 cm. longis 2 mm. latis apice obtusis

extus medio sericeo-pubescentibus intus glabris. Fl. ♀: marginales liguliformes 1-seriatim siti, tubo 1 mm. longo, limbo liguliformi oblanceolato  $1\frac{1}{2}$  cm. longo 4 mm. lato apice obtuso 3-dentato extus glabro intus minutissime hirsuto. Fl. disci ♂: corolla tubuloso-campanulata 3 mm. longa apice 5-lobata, lobis triangularibus  $\frac{1}{3}$  mm. longis. Achaenium maturum ignotum.

HAB. Taitō: Chakan, leg. U. MORI, Jan. 1908.

Near *Chrysanthemum sinense* SABIN. var. *japonicum* MAXIM.; but differs from it in the much narrower leaves. Also near *Ch. morifolium* RAMAT.; but differs from it in having more deeply lobate or laciniate leaves.

2. **Chrysanthemum arisanense** HAYATA l.c. p. 38.

3. **Chrysanthemum indicum** LINN.; HAYATA l.c. p. 38.

### *Cotula* LINN.

**Cotula anthemoides** LINN.; HAYATA l.c. p. 38.

### *Myriogyne* LESS.

(*Centipeda* LOUR.)

**Myriogyne minuta** LESS.; HAYATA Gen. Ind. p. 40.

### *Artemisia* LINN.

*Key to species.*

1. Heads heterogamous, disc-flowers sterile.....2.  
Heads heterogamous; all fertile .....4.
2. Heads very small  $1\frac{1}{2}$  mm. in diameter .....1. *A. capillaris*.  
Heads more than  $2\frac{1}{2}$ –3 mm. in diameter .....3.
3. Heads nearly 4 mm. in diameter; leaves mostly clustered at the base of the stem .....2. *A. oligocarpa*.  
Heads nearly 3 mm. or  $2\frac{1}{2}$  mm. in diameter. Leaves scattered along the stem .....3. *A. morrisonensis*.
4. Leaves oblong not pinnatifid, whitish beneath .....4. *A. anomala*.  
Leaves pinnatifid .....5.
5. Leaves silky or cottony on the under side.....6.  
Leaves neither silky nor cottony on the under side, nearly glabrous.....8.
6. Stem all leafy .....5. *A. vulgaris*.

4. **Artemisia anomala** S. Moore in Journ. Bot. (1875), p. 227; HEMSL. Ind. Fl. Sin. I. p. 441. Herba suffruticosa simplex 60–80 cm. longa subglabra recta ad totam longitudinem foliata. Folia alterna oblongo-lanceolata 7 cm. longa  $2\frac{1}{2}$  cm. lata apice acuta vel acuminata basi acuta margine serrulata



supra glabra subtus glaucissima molle hirsuta, petiolis 5 mm. longis. Capitula spicato-paniculata, paniculis axillaribus vel terminalibus, capitulis sessilibus. Involucrum oblongo-globosum 3 mm. longum  $1\frac{1}{2}$  mm. latum, bracteis 3-4-seriatim dispositis, interioribus oblongis vel late spathulatis  $2\frac{1}{2}$  mm. longis 1 mm. latis. Fl. ♀: corolla filiformis  $1\frac{1}{2}$  mm. longa granulis notata. Fl. ♂: corolla tubulosa, limbo dilatato. Achænium ignotum.

HAB. Ritōzan, leg. T. KAWAKAMI, Aug. 1913.

5. **Artemisia vulgaris** LINN. var **indica** MAXIM.; HAYATA l.c. p. 38.

6. **Artemisia** (§ *Abrotanum*) **Somai** HAYATA sp. nov. (Pl. VIII.) Suffrutex cum inflorescentiis 20-50 cm. longus basi lignosus. Folia dense approximata pinnatifida in ambitu obovato-spathulata 7 cm. longa 3 cm. lata basi ad petiolum 1 cm. longum abeuntia, segmentis linearibus 1-2 cm. longis 2-3 mm. latis acutis, supra subglabra subtus dense argenteo-hirsuta. Racemi simplices vel paniculati 10-30 cm. longi efoliati vel foliis minoribus instructi, pedicellis 2 mm. longis. Capitulum 4 mm. longum subglobosum, involucri bracteis 3-4-seriatim dispositis, bracteis extimis oblongis 2 mm. longis 1 mm. latis, interioribus spathulatis 3 mm. longis apice obtusissimis denticulatis extus hirsutis intus glabris. Fl. ♀: marginales tubuliformes; corolla apice 3-dentata. Fl. ♂: corolla tubuloso-campanulata 2 mm. longa 1 mm. lata 5-lobata, lobis reflexis, deorsum granulis notata. Achænium ignotum.

HAB. Arisan: Tozan, leg. T. SŌMA Dec. 1915.

7. **Artemisia batakensis** HAYATA sp. nov. Perennis basi lignosa cum racemis 50-60 cm. longa apice ramosissima. Folia dense approximateque disposita bipinnatifida cum petiolis 8-10 cm. longa, pinnis linearibus 2-4 cm. longis 3 mm. latis, supra parce subtus dense albo-lanata. Capitula racemosa, racemis ramosissimis circ. 30 cm. longis, rhachibus lanatis, pedicellis 1-2 mm. longis lanatis. Involucrum urceolato-campanulatum 4-5 mm. longum, bracteis 3-4 seriatim sitis, extimis ovatis 2 mm. longis extus lanatis intus glabris, interioribus spathulatis  $3\frac{1}{2}$  mm. longis apice rotundatis irregulariter denticulatis extus lanatis intus glabris. Receptaculum plus minus convexum glabrum. Fl. ♀: marginales; corolla tubuliformis 2 mm. longa apice 3-dentata, stylo longe exserto 2-fido, ramis 1 mm. longis. Fl. ♂: corolla tubuloso-campanulata  $2\frac{1}{2}$  mm. longa apice 5-lobata, lobis exterioribus recurvis, deorsum granulis notata.

Achaenia obovoideo-cylindrica 1 mm. longa glabra apice longe barbata, barbis 2 mm. longis crispis, 4-5-costata.

HAB. inter Shinjō et Batakan, leg. B. HAYATA et S. SASAKI, Aprili. 1917.

Near *A. Somai* HAYATA, but differs from it by the long barbate achenes.

8. **Artemisia Kawakamii** HAYATA sp. nov. (Pl. IX.) Suffrutex annuus cum racemis 7-8 cm. longus simplex. Folia dense approximativè disposita bipinnati-secta in ambitu oblonga obovata  $2\frac{1}{2}$  cm. longa 1-2 cm. lata supra subglabra subtus dense argenteo-hirsuta, segmentis linearibus 1 mm. latis apice acutis. Racemi axillares simplices 7 cm. longi 2-3-capituliferi, pedicellis 2-3 mm. longis. Involucrum globoso-campanulatum 3 mm. in diametro extus parce lanatum, bracteis spathulatis 3 mm. longis 1 mm. latis apice obtusissimis; receptaculum convexum glabrum. Fl. ♀: corolla tubulosa  $1\frac{1}{2}$  mm. longa apice 3-lobata. Fl. ♂: corolla tubuloso-campanulata 2 mm. longa 5-lobata, lobis recurvis. Achaenia ignota.

HAB. Mt. Morrison, ad 8000 ped. alt., leg. T. KAWAKAMI et S. SASAKI, Oct. 1909.

9. **Artemisia annua** LINN.; HAYATA l.c. p. 37.

10. **Artemisia lactiflora** WALL. ex DC. Prodr. VI. p. 115; MAXIM. in Mém. Biol. VIII. p. 535; HEMSL. Ind. Fl. Sin. I. p. 444; DUNN et TUTCHER Fl. Hongt. et Kwangt. p. 147. Herba suffruticosa 50-60 cm. longa tota longitudine foliata glabra. Folia pinnatifida vel pinnatisecta in ambitu obovata 6-7 cm. longa 3-4 cm. lata, segmentis interioribus minoribus, superioribus majoribus obovatis apice acutis serratis, utraque glabra. Capitula spicativè disposita, spicis terminalibus vel axillaribus simplicibus vel paniculativè dispositis, capitulis sessilibus. Involucrum subglobosum 2 mm. in diametro, bracteis 2-3-seriatim dispositis, interioribus oblongis  $2\frac{1}{2}$  mm. longis 1 mm. latis utraque glabris. Fl. ♀: corolla filiformis 1 mm. longa. Fl. ♂: corolla tubuloso-campanulata  $1\frac{1}{2}$  mm. longa  $\frac{1}{2}$  mm. lata 5-lobata, lobis exterioribus recurvis acutis; antheræ appendices cuspidato-acuminatæ. Achaenium maturum ignotum.

HAB. Kelung, Y. SHIMADA, Dec. 1908.

An accurate description of the species is not accessible. In my species, the involucre is too small for *A. lactiflora*.

11. **Artemisia niitakayamensis** HAYATA l.c. p. 37.

*Crossostephium* LINN.*Crossostephium artemisioides* LESS.; HAYATA l.c. p. 38.*Gynura* CASS.*Key to the species.*

1. Leaves pinnatifid.....1. *G. pinnatifida*.  
Leaves entire, lobed or dentate, but not pinnatifid.....2.
2. Leaves subentire .....2. *G. elliptica*.  
Leaves serrate, dentate or lobed .....3.
3. Leaves obovate-lanceolate or lanceolate, irregularly dentate...3. *G. bicolor*.  
Leaves oblong or ovate.....4.
4. Flowers yellow .....4. *G. flava*.  
Flowers reddish yellow .....5. *G. ovalis*.

1. ***Gynura pinnatifida*** DC. Prodr. VI. p. 301; FRANCH. et SAV. Pl. Jap. I. p. 245; HEMSL. Ind. Fl. Sin. I. p. 448.

HAB. Tamsui et Tenmenzan, leg. T. SŌMA, Nov. 1914.

New to the flora of Formosa.

2. ***Gynura elliptica*** YABE et HAYATA; HAYATA l.c. p. 39.

3. ***Gynura bicolor*** DC.; HAYATA l.c. p. 39.

4. ***Gynura flava*** HAYATA l.c. p. 39.

5. ***Gynura ovalis*** DC.; HAYATA l.c. p. 39.

*Cacalia* LINN.*Key to species.*

1. Leaves palmately lobed .....1. *C. intermedia*.  
Leaves simple not lobed .....2. *C. monantha*.

1. ***Cacalia intermedia*** HAYATA n. n. *Senecio intermedius* HAYATA l.c. p. 40.

2. ***Cacalia monantha*** (DIELS) n. n. *Senecio monanthus* DIELS; HAYATA l.c. p. 40.

*Senecio* LINN.*Key to species.*

1. Scandent and trailing .....2.



- Erect .....3.  
 2. Leaves triangularly lanceolate 9 cm. long serrulate .....1. *S. scandens*.  
 Leaves much smaller at most 4 cm. long, margin lobulate or grossly den-  
 tate.....2. *S. cratægifolia*.  
 3. Leaves nearly entire or obscurely serrulate .....4.  
 Leaves distinctly serrulate, dentate or laciniate .....5.  
 4. Plant from the first not cottony hairy, but nearly glabrous; radical leaves  
 ovato-oblong attenuate to the base of the petioles; petioles 20–30 cm.  
 long .....3. *S. taitoensis*.  
 Plant cottony white hairy at first, but nearly glabrous at length; radical  
 leaves spatulate 5 cm. long.....4. *S. Tashiroi*.  
 5. Leaves laciniate .....5. *S. morrisonensis*.  
 Leaves not laciniate .....6.  
 6. Leaves sharply serrate or dentate .....6. *S. tozanensis*.  
 Leaves serrulate or denticulate.....7. *S. angustifolius*=*S. taiwanianus*.

1. **Senecio scandens** BUCH.-HAM.; HAYATA l.c. p. 40.

2. **Senecio cratægifolia** HAYATA sp. nov. Scandentissima; caulis an-  
 gulatus multo-striatus. Folia hastato-lanceolata vel triangulari-lanceolata 3–4  
 cm. longa  $1\frac{1}{2}$  cm. lata apice acuminata basi lobulata obtusa margine remote  
 mucronibus instructa chartacea utraque pagine glabra, petiolis 3–4 mm. longis.  
 Capitula laxa paucique cymosa. Involucrum late campanulatum bracteolis  
 minutis linearibus 1–2 mm. longis 4–5 instructum, bracteis involucri 1-seriatim  
 sitis linearibus 6 mm. longis 1 mm. latis apice acuminatis margine tenuibus  
 glabris. Fl. marginales ♀: liguliformes 1-seriatim dispositi; ovarium hir-  
 sutum cylindricum; pappi setae albæ scabræ 4 mm. longæ; corollæ tubus 3  
 mm. longus, limbo lineari-oblongo 5 mm. longo 2 mm. lato apice obtusissimo  
 minute 3-denticulato 4-nervio glabro. Fl. ♂: centrales ∞; corolla tubuloso-  
 campanulata 5 mm. longa glabra, tubo 3 mm. longo  $\frac{1}{5}$  mm. lato, limbo cylindrico-  
 campanulato 2 mm. longo  $\frac{2}{3}$  mm. lato apice 5-lobato, lobis oblongo-triangularibus  
 $\frac{2}{3}$  mm. longis  $\frac{1}{3}$  mm. latis apice acutis. Achænium maturum ignotum.

HAB. Montibus centralibus, leg. U. MORI et S. NAKAI, Dec. 1909 (typus!);  
 Mt. Morrison, leg. U. MORI.

Differs from *S. scandens* by the hirsute achenes.

3. **Senecio taitoensis** HAYATA l.c. p. 40.

4. **Senecio Tashiroi** HAYATA sp. nov. Caulis scapiformis 30 cm. longus plus minus lanatus subsimplex. Folia radicalia oblongo-oblanccolata 5 cm. longa  $1\frac{1}{2}$  cm. lata apice acuta vel obtusa basi attenuata margine irregulariter serrulata utraque pagine primum sparse lanata demum glabrata; folia caulina lanceolata vel linearia sessilia. Capitula ad apicem caulis pauce laxèque cymosa. Involucrum late obconicum 13 mm. latum 7 mm. longum, cum floribus marginalibus 3 cm. in diametro, bracteolis nullis; bracteis involucri circ. 1-seriatim dispositis linearibus 7 mm. longis extus plus minus hirsutis  $\frac{2}{3}$  mm. latis. Flores ♀: marginales liguliformes; ovarium hirsutum cylindricum  $1\frac{1}{2}$ –2 mm. longum; pappi setæ albæ scabræ 3–4 mm. longæ; corollæ tubus 4 mm. longus  $\frac{1}{4}$  mm. latus, limbo clavato-lineari 12 mm. longo 3 mm. lato apice truncato 3-lobulato, lobis triangularibus  $\frac{1}{2}$ –1 mm. longis, basi attenuato. Fl. ♂: ∞ centrales; corolla tubuloso-campanulata 7 mm. longa apice  $1\frac{1}{2}$  mm. lata apice 5-lobata, lobis oblongo-triangularibus circ. 1 mm. longis apice acutis. Achænium maturum ignotum.

HAB. Montibus centralibus, leg. U. MORI, Aprili. 1910 (typus!)

*Senecio campestris* HAYATA (non LINN.) Gen. Ind. p. 40.

Near *S. campestris*, but differs from it by the much longer styles.

5. **Senecio morrisonensis** HAYATA l.c. p. 40.

6. **Senecio tozanensis** HAYATA l.c. p. 40.

7. **Senecio angustifolius** HAYATA l.c. p. 40.

*Senecio taiwanianus* HAYATA l.c. p. 40.

### *Ligularia* CASS.

#### *Key to species.*

1. Leaves palmately parted .....1. *L. japonica* var. *scaberrima*.  
   Leaves reniformed .....2.
2. Leaves remotely serrulate or subentire.....2. *L. Tussilaginea*.  
   Leaves shallowly 5-lobed or pentangular .....  
   .....3. *L. Tussilaginea* var. *formosana*.
1. **Ligularia japonica** LESS. var. **scaberrima** HAYATA n. n.  
*Senecio japonicus* SCH.-BIP. var. *scaberrima* HAYATA l.c. p. 40.

2. **Ligularia Tussilaginea** (BURM.) MAKINO.*Senecio Kaempferi* DC. HAYATA l.c. p. 40.3. **Ligularia Tussilaginea** (BURM.) MAK. var. **formosana** HAYATA n.v.

Folia reniformia angulata tenuiter 9–10-lobata, lobis late triangularibus, margine mucronibus remotissime instructa, cæterum ut typica.

HAB. Kaokaokei, Keibi, Shinkogai, Kelung.

Differs from the type by the lusterless angular leaves.

**Echinops** LINN.**Echinops dahuricus** LINN.; HAYATA l.c. p. 39.**Saussurea** DC.*Key to species.*

1. Leaves triangularly oblong, truncate or slightly sagittate at the base.....1. *S. formosana*.  
     .....Leaves pinnatifid .....2.
2. Leaves not cottony beneath.....2. *S. japonica* var. *longicephala*.  
     Leaves cottony beneath .....3. *L. affinis*.

1. **Saussurea formosana** HAYATA sp. nov. Caulis erectus 60–100 cm. longus parce albo-lanatus demum glabratus multo-striatus. Folia inferiora oblongo-triangularia 20 cm. longa 14 cm. lata apice acuta basi late sagittata rarius ad petiolum decurrentia margine remote serrulata membranacea supra subglabra subtus tenuiter albo-lanata, petiolis 20 cm. longis. Capitula ad apicem ramorum terminalia vel axillaria vel racemosa longe pedunculata; capitula subglobosa 5–6 cm. in diametro. Involucrum late campanulatum 2 cm. longum, bracteis  $\infty$ -seriatim dispositis imbricatis exterioribus brevioribus linearibus, interioribus longioribus linearibus 1 cm. longis 2–3 mm. latis infra apicem contractis versus apicem aristato-serrulatis extus molle lanatis intus glabris, intimis longissimis 15 mm. longis 2 mm. latis apice acuminatis prope apicem serrulis unciformibus 2–3 instructis. Flores  $\infty$  omnes tubuliformes. Achænium maturum clavato-cylindricum tetragonum 4 mm. longum  $1\frac{1}{2}$  mm. latum apice truncatum basi obtusum glabrum nigrum ad angulos et faciem transverse pauce regulosum margine apicis denticulatum; pappi setæ 15–20 plumosæ 18 mm. longæ; corolla tubulosa 18 mm. longa, tubo 1 cm. longo  $\frac{1}{4}$



mm. lato, limbo tubuliformi 6–7 mm. longo  $1\frac{1}{2}$  mm. lato apice 5-lobato, lobis linearibus  $2\frac{1}{2}$  mm. longis  $\frac{1}{4}$  mm. latis.

HAB. Arisan: Karapin, leg. B. HAYATA, Jan. 1912, (typus!); Taitō: Bunshiseki, Uchitaroko et Tanasai.

Near *Saussurea deltoidea*; but differs from it in the remotely serrulate or nearly entire leaves.

2. ***Saussurea japonica*** DC. var. ***longicephala*** HAYATA l.c. p. 40.

3. ***Saussurea affinis*** SPRENG; HAYATA l.c. p. 40.

### *Cirsium* Scop.

1. ***Cirsium brevicaule*** A. GR.; HAYATA l.c. p. 38.

2. ***Cirsium chinense*** GARD.; HAYATA l.c. p. 38.

3. ***Cirsium japonicum*** DC.; HAYATA l.c. p. 38.

4. ***Cirsium Kawakamii*** HAYATA l.c. p. 38.

5. ***Cirsium Morii*** HAYATA sp. nov. Herba 20–30 cm. alta; caulis subsimplex. Folia radicalia non visa, caulina linearia 15–20 cm. longa 2–3 cm. lata apice acuminata subsessilia margine laciniato-serrata, serris vel laciniis triangularibus apice setulis instructis, utraque pagine primum albo-tomentosa supra demum subglabrata. Capitula solitaria terminalia subglobosa 5–6 cm. in diametro, bracteis involucri 3–4-seriatim dispositis, exterioribus brevioribus linearibus 5 mm. longis apice setulosis, interioribus longioribus 3–4 cm. longis linearibus scariosis. Flores omnes ♂; corollae tubo filiformi  $1\frac{1}{2}$  cm. longo, limbo 14 mm. longo 2 mm. lato apice ad  $\frac{1}{3}$  longitudinem lobato, lobis linearibus 5 mm. longis  $\frac{1}{2}$  mm. latis; pappi setae plumosae. Achænium maturum ignotum.

HAB. Chakankei, leg. U. MORI, Jan. 1908.

Near *C. brevicaule*; but differs from it in having white thin cottony hairs all over the plant.

6. ***Cirsium Wallichii*** DC.; HAYATA l.c. p. 38. Very likely identical with *C. Kawakamii* HAYATA.

### *Ainsliea* DC.

#### *Key to species.*

1. Leaves palmately lobed.....1. *A. secundiflora*.

- Leaves not lobed .....2.
2. Leaf-base cordate or truncate never decurrent to the petioles .....3.  
 Leaf-base decurrent to the petioles.....6.
3. Leaves quasiverticillate below the middle of the stem .....  
 ..... 2. *A. macroclinidioides*.  
 Leaves usually basal or radical .....4.
4. Leaves 1-1½ cm. long .....3. *A. paucicapitata*.  
 Leaves 3-6 cm. long.....5.
5. Leaves deeply cordate .....4. *A. asarifolia*.  
 Leaves slightly cordate or truncate.....5. *A. Kawakamii*.
6. Achene perfectly glabrous .....*A. morrisonicola*.  
 Achene more or less hirsute.....5. 6. *A. reflexa*.

1. **Ainsliæa secundiflora** HAYATA (Pl. X.) l.c. p. 37.

2. **Ainsliæa macroclinidioides** HAYATA l.c. p. 37.

3. **Ainsliæa paucicapitata** HAYATA sp. nov. Folia omnia radicalia cordata 1½ cm. longa totiusque lata apice triangulari-acuta mucronata basi cordata margine remote mucronibus instructa supra tenuiter subtus dense fulvo-hirsuta, petiolis 1-1½ cm. longis tomentosis. Scapi aphylli 20 cm. longi ebracteati, capitulis spicatis. Involuerum late obconicum circ. 10 mm. longum, bracteis multi-seriatim dispositis, interioribus lineari-lanceolatis 8 mm. longis 1½ mm. latis. Capitula 3-florata. Corollæ tubus 5 mm. longus, limbo 5-partito, partibus linearibus 5 mm. longis ⅓ mm. latis apice acutis. Achænium dense hirsutum; pappi setæ plumosæ.

HAB. Nōkōsan, ad 9000 ped. alt., leg. U. MORI, Jan. 1908.

Near *A. morrisonicola* HAY.; but differs from it by the much hairy leaves with cordate base.

4. **Ainsliæa asarifolia** HAYATA sp. nov. (Pl. XI.) Perennis. Folia omnia radicalia vel ad supra basin caulis quasiverticillatim insita oblongo-cordata 7 cm. longa 4½ cm. lata apice obtusa ad centrum summorum brevissime mucronata basi cordata margine remotissime mucronibus instructa utraque pagine primum molle fulvo-tomentosa demum glabrata membranacea, petiolis 6-7 cm. longis fulvo-tomentosis, pilis mollis longis. Scapi 30 cm. longi efoliati bracteis minutis remote instructi subglabri. Capitula versus apicem scapi spicatis vel racemosim

subsecunde disposita. Involuerum conico-cylindricum circ. 1 cm. longum glabrum, bracteis 3-4-seriatim dispositis, bracteis interioribus oblanceolatis 7 mm. longis 2 mm. latis apice obtusis. Corolla circ. 1 cm. longa, tubo 5 mm. longo  $\frac{1}{2}$  mm. lato, limbo 5-partito, segmentis linearibus 7 mm. longis  $\frac{2}{3}$  mm. latis apice obtusis. Antheræ appendices lineares 1 mm. longae truncatæ vel obtusæ, caudis linearibus 1 mm. longis plus minus laceratis. Stylus 1 cm. longus basi conico-dilatatus apice 2-fidus, ramis  $\frac{1}{2}$  mm. longis recurvis. Achænium maturum ignotum. Pappi setæ copiosæ plumosæ.

HAB. Kelung, leg. B. HAYATA, Aprili. 1916.

5. **Ainsliæa Kawakamii** HAYATA sp. nov. Folia fere omnia quasi-radicalia approximativè sita ovata vel cordato-ovata 6 cm. longa  $3\frac{1}{2}$  cm. lata apice obtusa mucronata basi cordata margine utroque latere mucronibus remote instructa supra glabra subtus pallida hirsuta subtrinervia, petiolis 5-6 cm. longis molle tomentosis. Scapi aphylli 40-50 cm. longi, capitulis racemosim dispositis, pedicellis 5 mm. longis hirsutis. Involuerum conico-cylindricum 13 mm. longum 3 mm. latum, bracteis imbricatis, exterioribus brevioribus triangularibus interioribus longioribus linearibus. Corollæ tubus 5 mm. longus, limbo 5-partito, partibus linearibus 8 mm. longis 1 mm. latis apice acuto-obtusis. Achænium dense hirsutum; pappi setæ plumosæ.

HAB. Loco non indicato, leg. T. KAWAKAMI.

Near *A. reflexa*, but differs from it by the cordate leaves with no decurrent base.

6. **Ainsliæa reflexa** MERRILL; HAYATA l.c. p. 37.

### *Gerbera* GRON.

***Gerbera integripetala*** HAYATA l.c. p. 39.

### *Picris* LINN.

***Picris morrisonensis*** HAYATA sp. nov. (Fig. 29). Perennis erecta 40 cm. longa pantentè hirsuta sursum ramosa, pilis rectis apice furcatis, basi lignosa. Folia linearia 9 cm. longa 4-6 mm. lata apice acuminata basi attenuata margine remote serrulata et utraque pagine patenti-hirsuta subsessilia. Capitula ad apicem ramorum terminalia. Involucri bracteæ 2-seriatim dispositæ, exterioribus minoribus, interioribus longioribus linearibus 13 mm. longis 1 mm.



longis apice acuminatis dorso hirsutis. Fl. ignoti. Achaenium maturum ferrugineo-fulvum fusiforme 4–5 mm. longum 1 mm. vel minus quam 1 mm. latum apice plus minus rostratum basi obtusum minute transverse elevato-striatum vel rugulosum  $\infty$ -costatum; pappi setae copiosae 6 mm. longae albae plumosae.

*Picris hieracioides* HAYATA Fl. Mont. Formos. p. 143 (non LINN.).

HAB. Monte Morrison, leg. U. MORI. Differs from *P. hieracioides* LINN. by the much narrower leaves.

#### *Taraxacum* HALL.

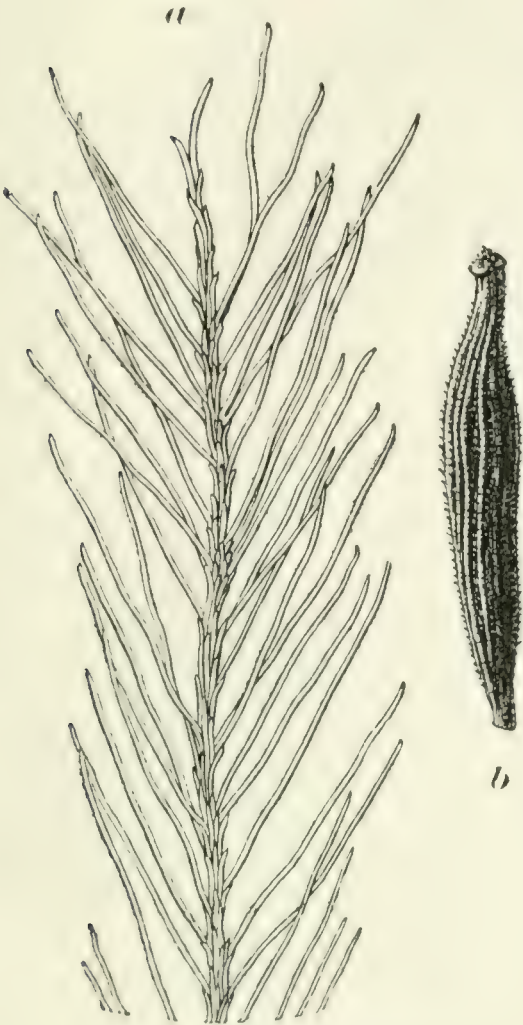
***Taraxacum platycarpum* H.**  
DAHLST.; HAYATA l. c. p. 41.

#### *Lactuca* LINN.

##### *Key to species.*

1. Outer involucre bracts gradually passing to inner ones in length.....2.  
Outer involucre bracts minute, inner ones very long, no transitional ones between them.....6.
2. Creeping, stoloniferous .....1. *L. brachyrhyncha*.  
Erect, tall herbs.....3.
3. Perfectly glabrous. ....4.  
More or less hirsute. ....5.
4. Cauline leaves linear.....2. *L. brevirostris*.  
Cauline leaves pinnatifid. ....3. *L. mansuensis*.
5. Cusps at the apex of the leaves linear. ....4. *L. Mori*.  
Cusps at the apex of the leaves acuminate-triangular ...5. *L. formosana*.
6. Flowers purple, stem 80–100 cm. tall.....6. *L. sororia*.

Fig. 29, *Picris angustifolia* HAYATA; a, a portion of a pappus-hair; b, an achene.



- Flowers yellow, usually small herbs. ....7.
7. Pappus brownish. ....7. *L. Oldhami*.  
 Pappus white.....8.
8. Decumbent. Heads  $1\frac{1}{2}$  cm. long, larger than the following species.....  
 .....8. *L. debilis*.  
 Erect. Heads smaller.....9.
8. Small herb, nearly 15 cm. long, leaves smaller.....9. *L. taitoensis*.  
 Larger herb, more than 30 cm. tall.....10.
10. Leaves lacerate. ....10. *L. lacerrima*.  
 Leaves linear not lacerate. ....11. *L. flavissima*.

1. ***Lactuca brachyrhyncha*** HAYATA sp. nov. (Fig. 31-8). Herba humilis repens stolonifera. Folia simplicia vel trifoliolata, foliolis obovatis vel rotundatis irregulariter crenatis basi subito cuneatis, petiolis 1-2 cm. longis, toto glaberrimis. Capitula solitaria terminalia. Involuerum obconico-campanulatum 1 cm. longum totiusque latum, bracteis 3-4-seriatim dispositis, extimis minutis ovatis 1 mm. longis, interioribus gradatim longioribus, intimis lanceolatis 8 mm. longis 2 mm. latis apice obtusis ad summum hirsutis. Flores flavi. Achænium maturum fusco-fulvum cylindricum basi obtusum apice fusiforme rostratum, rostro  $\frac{1}{2}$  mm. longo, cum rostro 7 mm. longum  $1-1\frac{1}{2}$  mm. latum prominente 10-costatum; pappi setæ albæ  $4\frac{1}{2}$  mm. longæ scabræ.

HAB. Kelung, Tamsui.

*Lactuca repens* HAYATA (non MAXIM.); HAYATA Gen. Ind. p. 40.

Near *L. repens* MAXIM.; but differs from it in having much shorter beaks of the achenes.

2. ***Lactuca brevirostris*** CHAMP.; HAYATA l. c. p. 40.

3. ***Lactuca mansuensis*** HAYATA sp. nov. (Fig. 31-6). Annua erecta recta simplex haud ramosa 50 cm. longa glaberrima toto foliata. Folia remote sita glaberrima pinnatilobata, in ambitu obovato-oblonga, lobis linearibus utroque latere 2-3, lobo terminali lineari 2-3 cm. longo 5 mm. lato apice acuto, petiolis 1-2 cm. longis vel nullis late alatis. Capitula laxo cymoso-racemosa. Involuerum late campanulatum 1 cm. longum  $1\frac{1}{2}$  cm. latum, bracteis involucri 2-3-seriatim dispositis, exterioribus minoribus, interioribus gradatim longioribus imbricatis linearibus 14 mm. longis 2 mm. latis apice obtusis. Flores ignoti.

Achaenium nigrum valde complanatum oblongum rostris exceptis 4–4½ mm. longum 2½ mm. latum basi obtusum apice acutum ad rostram 1½ mm. longam abeuns facie transverse rugulosum; pappi setae copiosae albae 8 mm. longae scabrae.

HAB. Mansu (Kōshūn), leg. T. SŌMA, Dec. 1913.

Near *Lactuca brevirostris*, but differs from it in having more elongate heads with narrower bracts.

4. **Lactuca Morii** HAYATA sp. nov. (Fig. 30, 31–7). Herba erecta. Caulis 1–2 m. longus toto foliatus subglaber vel tenuiter hirsutus. Folia sessilia pin-



Fig. 30, *Lactuca Morii* HAYATA.

natiloba in ambitu oblonga, lobis lateralibus utroque latere 2–3, irregulariter dentata vel lacerata, lobo terminali minuto lineari caudiformi 1½ cm. longo 1 mm. lato, supra scabra subtus pallidissima ad venas costasque setuloso-hirsuta. Capitula racemoso-cymosa laxè disposita. Involucrum late campanulatum 1½ cm. longum totiusque latum basi bracteolis minutis instructum, bracteis involucri exterioribus brevioribus ovatis 1 mm. longis, interioribus longioribus, intimis longissimis linearibus 1½ cm. longis 2 mm. latis glabris apice obtusis. Fl. ut videntur ochracei. Achaenium maturum nigricans valde complanatum obovatum rostris exceptis 4 mm. longum 2½ mm. latum basi obtusissimum vel rotundatum apice longe rostratum, rostris 3

mm. longis, facie minute transverseque rugulosum; pappi setae albae scabrae 6 mm. longae.

HAB. Hakkudaisan, leg. U. MORI.

Near *L. brevirostris*; but differs from it in having long-cuspidate leaves.

5. **Lactuca formosana** MAXIM.; HAYATA l. c. p. 40.

6. **Lactuca sororia** MIQ. (Fig. 31–5); HAYATA l. c. p. 40.

HAB. Urai, Agioku, ad 1200 ped. alt., B. HAYATA, Mai. 1916.



7. **Lactuca Oldhami** MAXIM.; in Mém. Biol. IX. p. 363. *Lactuca Thunbergiana* HAYATA (non MAXIM.) l. c. p. 40.

HAB. Shinjō, Kushaku, Kelung, Taitō, Shinkiku.

As far as my observations extend, the species is quite distinct from *L. Thunbergiana* MAXIM. to which it was reduced by W. B. HEMSLEY in his Ind. Fl. Sin. I. p. 484.

8. **Lactuca debilis** BENTH. et HOOK.; HAYATA l. c. p. 40.

9. **Lactuca taitōensis** HAYATA sp. nov. (Fig. 31-2). Herba humilis 15-20 cm. longa ramosissima. Folia radicalia vel caulina linearia 5-6 cm. longa 5 mm. lata apice acuminata basi attenuata subsessilia subintegra membranacea. Capitula laxissime cymosa, cymis ramosissimis laxè patentibus. Involucrum campanulatum 5 mm. longum basi bracteolis minutis 5 instructum, bracteolis ovatis cuspidatis 1 mm. longis; bracteis involucri lanceolatis 5 mm. longis apice acutis  $1\frac{1}{2}$  mm. latis glabris. Flores ignoti. Achænium longe rostratum cum rostris  $4\frac{1}{2}$  mm. longum (rostris filiformibus 2 mm. longis) rostris exceptis fusiforme 2 mm. longum 10-costatum ad costas rugosum; pappi setæ albæ 3 mm. longæ copiosæ scabræ.

HAB. Taitō: Pinan, leg. K. MIYAKE. *Lactuca gracilis* HAYATA (non DC.) in Gen. Ind. p. 40.

Near *L. versicolor*, but differs from it by the very much narrower leaves and yellow flowers.

10. **Lactuca lacerrima** HAYATA sp. nov. (Fig. 31-1). Herba annua 30 cm. longa glaberrima. Folia radicalia lacerrima tenuissime membranacea in ambitu spathulata 10-12 cm. longa  $1\frac{1}{2}$  cm. lata, laciniis patentissimis patentoserratis, basi ad petiolum longe attenuata; folia caulina minora minus lacerata. Capitula laxè cymoso-racemosa. Involucrum anguste campanulatum 5-6 mm. longum basi bracteolis minutis ovatis 1 mm. longis 5 instructum; bracteis involucri linearibus 6 mm. longis 1 mm. latis apice obtusis apice hirsutis. Flores ignoti. Achænium maturum longe rostratum cum rostris 1 mm. longis 4 mm. longum longe fusiforme basi obtusum 10 costatum ad costas minute hirsutum; pappi setæ albæ  $3\frac{1}{2}$  mm. longæ scabræ.

HAB. Inter Busegan et Seisui, leg. B. HAYATA, Mai. 1917.

Near *L. versicolor*, but differs from it in having lacerate leaves and in

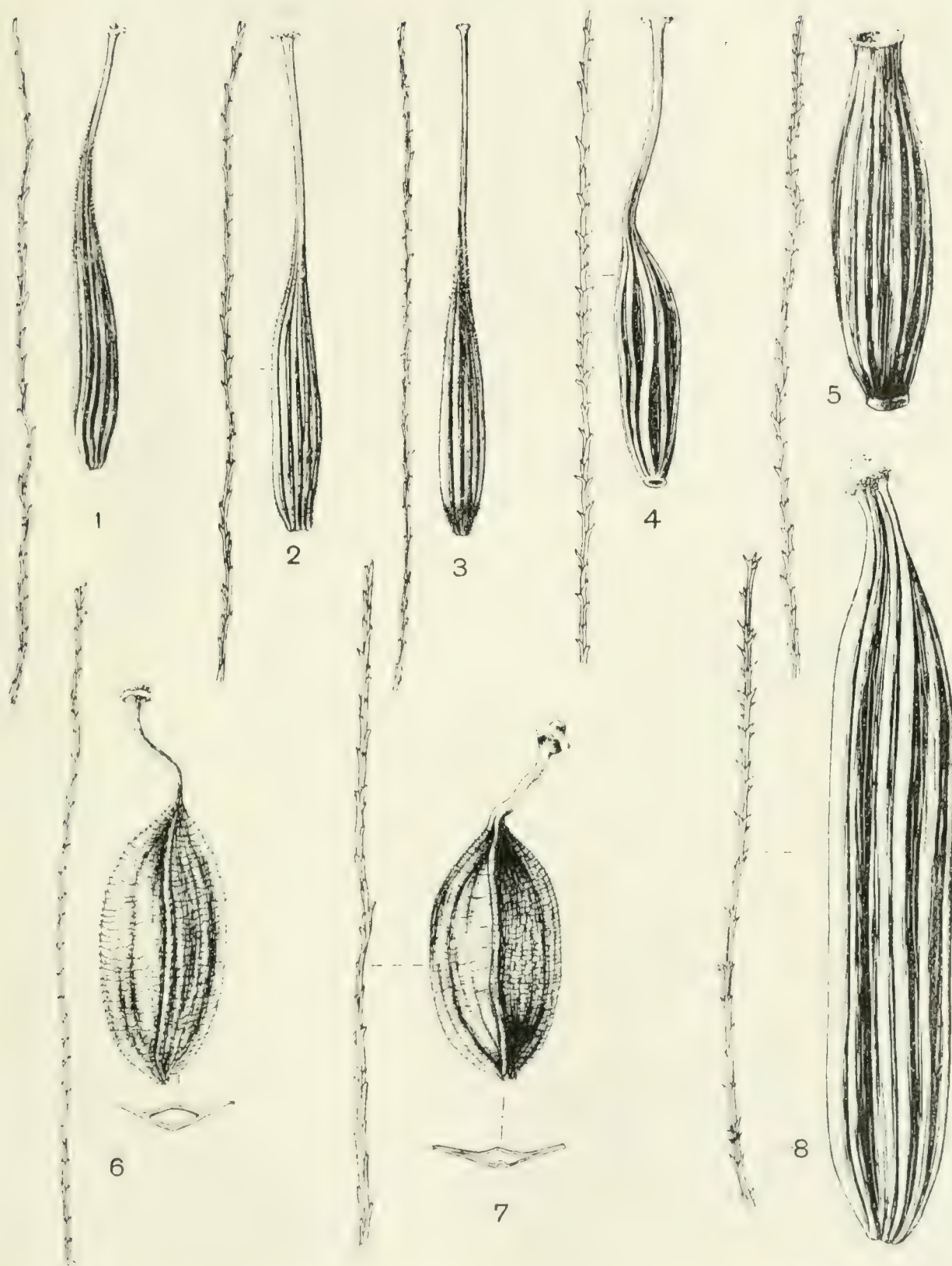


Fig. 31; 1, *Lactuca lacerrima* HAY.; 2, *L. taiioensis* HAY.; 3, *L. flavissima* HAY.; 4, *L. longirostra* HAY.; 5, *L. sororia* MIQ.; 6, *L. mansuensis* HAY.; 7, *L. Morii* HAY.; 8, *L. brachy-  
rhynga* HAY.

having always yellow flowers.

11. **Lactuca flavissima** HAYATA sp. nov. (Fig. 31-3). Herba 20-50 cm. lata glabra. Folia radicalia vel caulina lanceolata 12 cm. longa 1 cm. lata apice acuminata basi attenuata tenuiter membranacea margine integra vel remote serrulata glaberrima subsessilia. Capitula laxe cymoso-paniculata. Involucrum anguste campanulatum 7-8 mm. longum basi bracteolis ovatis 1 mm. longis 5 instructum; bracteis involucri linearibus 7 mm. longis 2 mm. latis apice obtusis glabris. Achænium maturum longe rostratum cum rostris 2 mm. longis 6 mm. longum fusiforme basi obtusum 10-costatum ad costam plus minus scabro-hirsutum; pappi setæ albæ scabræ 5-6 mm. longæ.

HAB. Taihoku.

*L. versicolor* HAYATA (non SCH.-BIP.) Gen Ind. p. 40.

Near *L. versicolor*; but differs from it in having always yellow-flowers.

### *Crepis* LINN.

#### *Key to species.*

1. Leaves lyrate or sinuate .....2.  
     Leaves entire or denticulate.....3.
2. Leaves lyrate with adpressed short hairs, stem 8-10 cm. tall .....  
     ..... 1. *C. formosana*.  
     Leaves serrulate or lyrate towards the base glabrous or nearly so, stem  
     20-50 cm. tall.....2. *C. japonica*.
3. Leaves entire, achenes perfectly smooth.....3. *C. koshunensis*.  
     Leaves obscurely denticulate or subentire, achenes minutely muricate.....  
     .....4. *C. integra*.

**Lactuca longirostra** HAYATA sp. nov. (Fig. 31-4). Herba basi lignosa 20-30 cm. longa glabra. Folia radicalia lineari-spathulata 8 cm. longa 1 cm. lata apice obtusissima rotundata basi longe attenuata membranacea margine integerrima; caulina basi sessilia subamplexicaulia minora. Capitula pauce laxe cymosa. Involucrum anguste campanulatum 6-7 mm. longum basi bracteolis 7-8 instructum, bracteolis ovatis acutis 1½ mm. longis, bracteis involucri 7½ mm. longis 2 mm. latis apice obtusissimis. Flores ignoti. Achænium maturum fusiforme longe rostratum, (rostris 2 mm. longis), cum rostris 4 mm. longum 10-costatum glabrum; pappi setæ albæ copiosæ 3 mm. longæ scabræ.

HAB. Bonin: Chichijima, Komagari, leg. H. HATTORI.

Near *Lactuca lanceolata* (= *Crepis integra*) in the lanceolate leaves; but distinctly differs from it in the very long-beaked achenes.



1. **Crepis formosana** HAYATA l. c. p. 38.

2. **Crepis japonica** THUNB.; HAYATA l. c. p. 38.

3. **Crepis koshunensis** HAYATA sp. nov. (Fig. 32). Herba diffusa stolonifera. Caulis florifer interdum 30–40 cm. longus. Folia radicalia dense rotatim disposita spathulata 10–12 cm. longa 2–2½ cm. lata apice obtusissima vel rotundata basi longe attenuata margine integerrima crassiuscula utraque glaberrima; folia caulina minora elliptica 3½ cm. longa 1½ cm. lata remotissime disposita. Capitula laxa cymosa. Involucrum tubuloso-campanulatum 5–6 mm. longum, bracteis 2-seriatim dispositis, exterioribus minutis lanceolatis 1½ mm. longis, interioribus longissimis lanceolatis 5 mm. longis apice obtusis apice hirsutis utroque pagine glabris. Flores omnes liguliformes; corollæ tubus 2 mm. longus extus hirsutus, limbo liguliformi lanceolato 6 mm. longo apice truncato 5-dentato. Achænium complanatum subcylindricum 4 mm. longum ½ mm. latum 10-costatum glabrum apice basique truncatum; pappi setæ albæ 3½ mm. longæ scabræ.



Fig. 32, *Crepis koshunensis*  
HAYATA.

HAB. Kōshūn; leg. K. MIYAKE, Juli. 1900.

Near *Crepis integra* MIQ.; but differs from it in the quite smooth (not muricate) achenes.

4. **Crepis integra** MIQ.; HAYATA l. c. p. 38.

### *Sonchus* LINN.

#### *Key to species.*

1. Leaves lanceolate or linear-lanceolate. ....1. *S. arvensis*.
- Leaves lyrate-pinnatifid .....2. *S. oleraceus*.
1. ***Sonchus arvensis*** LINN. HAYATA l. c. p. 41.
2. ***Sonchus oleraceus*** LINN. HAYATA l. c. p. 41.

*Hieracium* LINN.

**Hieracium Morii** HAYATA sp. nov. (Fig. 33.) Perennis 20–30 cm. longa. Caulis erectus rectus subsimplex longe paucique hirsutus. Folia radicalia longe spathulata 8 cm. longa 7 mm. lata apice obtusa basi longe attenuata margine mucronibus remote instructa, mucronibus uncinato-recurvis, utraque pagine et margine barbis longis sparse instructa. Capitula laxepauceque racemosa vel ad apicem ramorum solitaria. Involucrum obconico-campanulatum 1 cm. longum, bracteis 2–3-seriatim dispositis, exterioribus extus dense hirsutis, pilis nigricantibus apice glanduloso-globuliferis, interioribus glabris linearibus 8 mm. longis. Flores ignoti. Achaenium maturum glabrum cylindricum  $\frac{2}{3}$  mm. latum 3 mm. longum leviter vel obscure costatum; pappi setae 5 mm. longae validiusculae scabrae fulvescentes.

HAB. Montibus centralibus, leg. MORI et NAKAI.

Near *Hieracium japonicum* FR. et SAV., but differs from it in the much narrower and acuter leaves and in the brown achenes.



Fig. 33, *Hieracium Morii* HAYATA.

## Boragineæ.

*Trigonotis*.

**Trigonotis elevato-venosa** HAYATA (Pl. III). Ic. Pl. Formos. VI. p. 32.

HAB. Sōseikyaku, Taiheizan.

## Labiatae.

*Conspectus of genera.*

After BRIQUET in Pflanzenfamilien IV. 3-a p. 207.

- A. Style not gynobasic. Nutlets with lateral ventral hilums which are generally large and often longer than half the length of ovaries.....*Ajuga*.

- B. Style entirely gynobasic. Nutlets with basal hilums and generally smaller scars, or rarely  $\pm$  basal-dorsal hilums and apophyses.
- a.* Seeds transversal; embryo with curved radicula lying on one of the cotyledons; calyx with scutellum. ....*Scutellaria*.
- b.* Seeds erect, embryo with straight short radicula.
- α.* Stamens ascending, patent or erect.
1. Anthers with parallel or divaricate long or ovate cells which are not or very slightly connate at the apex into one, but never turning flat after dispersing pollens.
- △ Corolla deeply 2-lipped, with very different lobes; upper lips concave furcate. Anthers ovate.
- × Stamens 4, the posterior longer than the anterior.
- Anthers with parallel or slightly divaricate cells.  
.....*Lophanthus*.
- Anthers with divaricate cells.....*Glecoma*.
- ×× Stamens 4, the posterior shorter than the anterior.
- Calyx 2-lipped, lower lip reclining against the upper lip and closing the throat; corolla with galeiformed upper lip. ....*Brunella*.
- Calyx tubiformed campanulate 5-10-toothed, more rarely 2-lipped. Upper lip of the corolla concave, often galeiformed rarely flat.
- Upper lip of corolla concave or galeiformed, generally very much hairy.
- \* Style-branches very unequal, the posterior much shorter than anterior. ....*Leucas*.
- \*\* Style-branches nearly equal or equal.
- † Nutlets  $\pm$  sharply triangular with truncate apex.
- Calyx-teeth not spiny. ....*Lamium*.
- Calyx-teeth spiny. ....*Leonurus*.
- †† Nutlets with rounded apex....*Stachys*.
- Upper lip of corolla mostly short and flat



- glabrous.....*Anisomeles*.
- △△ Corolla strongly or slightly 2-lipped, upper lip often concave. Anthers with linear narrow cells. Stamens 2.  
.....*Salvia*.
- △△△ Corolla 2-lipped or nearly actinomorphic, with slightly different lobes. Upper lip, if exists, flat or very slightly concave. Anthers ovate.
- Calyx 10-13-rarely 15-nerved. Corolla 2-lipped. Stamens ascending under the upper lip.
- † Corolla exserted recurved ascendent. ...*Melissa*.
- †† Corolla straight. ....*Calamintha*.
- Calyx 10-13-nerved. Corolla 2-lipped. Stamens patent from the base, straightly spreading, nearly equal. ....*Origanum*.
- Calyx 10-13-nerved. Corolla nearly actinomorphic. Stamens spreading straight from the base and nearly equal.
- † Fertile stamens 2, the anterior with divaricate cells. Nutlets with flat truncate top. ....  
.....*Lycopus*.
- †† Stamens 4, with parallel cells. Nutlets with rounded top. ....*Mentha*.
- Calyx 10-nerved. Corolla differently 2-lipped or nearly actinomorphic. Stamens erect spreading, didynamous.
- † Fertile stamens 4, erect, spreading, the anterior longer. Corolla short 5-fid. ....*Perilla*.
- †† Fertile stamens 2, the posterior; the anterior reduced to staminodes. Corolla slightly 2-lipped; upper lip emarginate; lower lip 3-fid....  
.....*Mosla*.
2. Anthers rounded, with cells which are connate into one cell

and becoming flat after dispersion of pollens.

○ Anthers connate later. .... *Elsholtzia*.

○○ Anthers connate immediately, and at last flat.

† Calyx ovately tube-formed 5-toothed. Corolla 4-fid;  
the anterior lobes most prominent..... *Pogostemon*.

†† Calyx ovate-campanulate, 5-toothed. Corolla nearly  
equally 4-fid. .... *Dysophylla*.

β. Stamens descending, lying on the lower lip or involved by the  
latter.

1. Lower lip short, strongly curved, sacciformed, contracted at  
the base..... *Hyptis*.

2. Lower lip longer, concave or boat shaped, contracted at the  
base, but not strongly curved.

Filaments all free..... *Plectranthus*.

Filaments connate at the base. .... *Coleus*.

3. Lower lip hardly longer, but narrower, than the upper lip,  
flat or slightly concave.

Mature calyx with entire inwardly curved lower-lip.

Calyx in fruit tubiformed; verticillaster not capitate.  
..... *Mesona*.

Verticillaster capitate..... *Acrocephalus*.

Mature calyx with 2-toothed lower-lip.

Verticillaster capitate. .... *Acrocephalus*.

Verticillaster not capitate..... *Ocimum*.

### *Ajuga* LINN.

#### *Key to species.*

1. Leaves nearly glabrous obovate or rhombic, obtusely dentate or lobulate.  
..... 1. *A. dictyocarpa*.
- Leaves hirsute obovate-spathulate. .... 2.
2. Leaves repandous. .... 2. *A. bracteosa*.
- Leaves obtusely dentate. .... *A. genevensis*.

1. **Ajuga dictyocarpa** HAYATA sp. nov. Herba basi procumbens sursum ascendens, partibus ascendentibus 20–30 cm. longis, caulibus tenuiter hirsutis tetragonis. Folia membranacea caulina opposita obovata vel triangulari-obovata 3–4 cm. longa 2 cm. lata apice obtusissima vel rotundata basi obtriangulari-cuneata et subito attenuata ad petiolum abeuntia a medio deorsum integra medio sursum grosse obtusissime dentata vel lobulata supra subglabra subtus subglabra vel ad costas pubescentia; folia superiora sessilia, inferiora petiolata, petiolis 1–1½ cm. longis. Verticillastri ad axillas foliorum superiorum siti 5–10-florati. Flores breve pedicellati, pedicellis 1–2 mm. longis vel nullis. Calyx campanulatus 3½ mm. longus 3 mm. latus hirsutus glanduloso-punctatus subequaliter 5-lobatus, lobis longe triangularibus 2 mm. longis 1 mm. latis ciliatis. Corolla erecta, tubo recto erecto cylindrico 6 mm. longo dorso hirsuto 1½ mm. lato intus basi hirsuto annulato ore haud dilatato, limbo 2-labiato, labro superiore fere obsoleto vel brevissimo truncato hirsuto 1½–2 mm. lato, labro inferiore maximo horizontaliter patenti subtus hirsuto supra glabro trilobato, lobo medio maximo 3 mm. longo totiusque lato apice cordato-emarginato basi angustiore 2 mm. lato, lobis lateralibus minoribus oblongo-triangularibus 1–2 mm. longis apice obtusis patentibus. Stamina 4, posteriora breviora, anteriora longiora erecta longe exserta recta, filamentis glabris. Stylo glabro erecto 8 mm. longo apice 2-fido, ramo anteriore breviora, posteriore longiora. Pseudo-achæmium obovatum 2¼ mm. longum 1½ mm. latum plus minus complanatum distincte elevato-reticulatum, cicatricibus ventralibus oblongis 1⅔ mm. longis.

HAB. Taihoku: Dairyōtō, leg. T. KAWAKAMI.

Somewhat near *Ajuga glabrescens* Mx.; but differs from it by the much less hirsute leaves and stems.

2. **Ajuga bracteosa** WALL.; HAYATA l. c. p. 56.

3. **Ajuga genevensis** LINN.; HAYATA l. c. p. 56.

### *Scutellaria* LINN.

#### *Key to species.*

1. Leaves not punctate.....2.



- Leaves punctate.....4.
2. Corolla swollen on the anterior side at the base.....3.  
Corolla not swollen on the anterior side at the base.....1. *S. Tashiroi*.
3. Leaves smaller, thicker, petioles shorter. ....2. *S. luzonica*.  
Leaves larger, thinner, petioles longer.....3. *S. indica*.
4. Leaves linear-ovate, smaller, truncate at the base.....4. *S. rivularis*.  
Leaves ovate, larger, cuneate at the base.....5. *S. formosana*.

1. **Scutellaria Tashiroi** HAYATA sp. nov. Suffruticosa 60–100 cm. alta; caulis tenuiter tomentellus vel hirsutus. Folia ovata vel triangulari-ovata  $2\frac{1}{2}$ – $3\frac{1}{2}$  cm. longa 2– $2\frac{1}{2}$  cm. lata apice obtusissima basi tenuiter cordata margine crenata, crenis apice rotundatis plus minus ascendentibus; chartacea supra brevissime hirtella scabriuscula subtus brevissime villosa, petiolis 5–8 mm. longis hirsutis. Racemi axillares vel terminales 3–8 cm. longi, floribus oppositis, bracteis cuneato-rhomboideis 3 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi cuneatis extus glanduloso-hirsutis intus glabris; pedicellis 2 mm. longis hirsutis. Calyx extus glanduloso-hirsutus oblique campanulatus 3 mm. longus 2-labiatus flavo-punctatus intus glaber 2-labiatus, labro superiore latissimo brevissimo dorso scutello instructo, labro inferiore latissimo brevissimo. Corolla  $2\frac{1}{2}$  cm. longa basi extus hirsuta fauce dilatata 4 mm. lata, limbo 2-labiato, labro superiore 3-lobato, lobis lateralibus erectis oblique oblongis 4 mm. longis 3 mm. latis, lobo medio erecto cuculliformi apice emarginato, labro inferiore ovato 6 mm. longo 5 mm. lato apice rotundato. Stamina didynama, anterioribus brevioribus, sub labro superiore ascendentia, antheris glabris, loculis parallelis. Stylus glaber apice 2-fidus, ramo anteriore longiore. Discus basi gynophorii dispositus. Ovarium glabrum  $\frac{1}{2}$  mm. longum supra gynophorium insitum.

HAB. Loco non indicato, leg. Y. TASHIRO.

2. **Scutellaria luzonica** ROLFE; HAYATA l. c. p. 58.

3. **Scutellaria indica** LINN.; HAYATA l. c. p. 58.

4. **Scutellaria rivularis** WALL.; HAYATA l. c. p. 58.

5. **Scutellaria formosana** N. E. BROWN in Gard. Chron. (1894) p. 212:—  
“The stems are square and glabrous, about three-quarters of a line thick, dull green, with reddish brown angles. Leaves  $1\frac{1}{4}$  to 2 inches long, ovate, sub-obtuse, broadly cuneate at the base, obscurely 3 to 4-toothed on each margin,

glabrous and minutely punctate on both sides, bright shining green above, paler and often stained with purple beneath. Racemes terminal, 3–4 inches long, flowers opposite, the pairs  $\frac{1}{3}$ – $\frac{1}{2}$  inch distant. Bracts rhomboidal, 1 to  $1\frac{1}{4}$  line long,  $\frac{3}{4}$  line broad, like the pedicels and the calyx very minutely puberulous, green. Pedicels 2 lines long, green. Calyx  $\frac{1}{8}$  inch long, green, the shield on its upper lip subquadrate with rounded angles, about  $\frac{1}{8}$  inch long and broad. Corolla 1 to  $\frac{1}{4}$  inch long, pubescent with gland-tipped hairs, the upper lip  $\frac{1}{3}$  inch long, blue with a violaceous tinge, the lower lip transverse, broadly rounded, and slightly emarginate in front,  $\frac{1}{3}$  inch broad, white, slightly tinted with blue; the tube is white, with a pale greenish tinge.”

“*S. formosana* is closely allied to *S. javanica*, JUNGHUHN, but that is a taller plant, attaining a height of 3 feet.”

The species above mentioned is recorded from Formosa; but we have never seen the plant in the island. It is somewhat near to *S. rubropunctata*\* in the punctate leaves, but differs from it in the much larger leaves and looser racemes.

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\* ***Scutellaria rubropunctata*** HAYATA sp. nov. Herba basi leviter procumbens sursum erecta partibus erectis 20–40 cm. longis depresso-villosis rectis a basi usque ad apicem foliatis. Folia opposita membranacea triangularia vel triangulari-ovata  $2\frac{1}{2}$  cm. longa  $1\frac{1}{2}$ –2 cm. lata apice obtusa basi late truncata vel acuta rarius leviter cordata margine praeter basin serrata, serris triangularibus ascendentibus supra brevissime parvissime hirsuta subtus tenuiter velutinoso subtus minutissime rubro-punctata, petiolis  $1\frac{1}{2}$ – $2\frac{1}{2}$  cm. longis hirsutis. Racemi ad apicem caulium vel ramorum terminales 5 cm. longi subsessiles, floribus oppositis, bracteis minutis oblique spathulatis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice rotundatis basi cuneato-attenuatis utraque pagina glabris margine ciliolatis, pedicellis 1 mm. longis hirsutis. Calyx oblique campanulatus  $1\frac{1}{2}$  mm. longus 2 mm. latus extus hirsutus intus glaber aequaliter labiatus, labris brevissimis latissimis, labro posteriore dorso scutello instructo, scutello rotundato  $1\frac{1}{2}$  mm. longo. Corolla erecta 13 mm. longa, tubo 10 mm. longo basi anteriore gibboso, limbo 2-labiato, labro superiore 3-lobato, lobo medio cuculliformi, lobis lateralibus erectis oblique triangularibus 3 mm. latis 2 mm. longis apice obtusissimis, labro inferiore subrotundato 3 mm. longo. Stamina 4 didynama, anterioribus brevioribus, sub labro superiore ascendentia, antheris glabris cordatis, loculis subparallelis margine ciliolatis. Stylus apice 2-fidus, ramo posteriore obsoleto. Ovarium glabrum 4-partitum, partibus obovoideis, gynophoris  $\frac{1}{4}$  mm. longis; discus infra gynophorium situs  $\frac{1}{4}$  mm. altus anteriore in glandam tumens.

HAB. Loo-choo: Okinawa, leg. Y. TASHIRO, No. 8 et 7.

Near *S. formosana* N. E. BROWN, but different from it by the much smaller leaves and denser racemes.



*Lophanthus* BENTH.

**Lophanthus formosanus** HAYATA sp. nov. = *Lophanthus rugosus* HAYATA Gen. Ind. p. 56. (non FISCH. et MEY.) Herba basi suffruticosa circ. 60 cm. longa erecta recta tetragona 3–4 mm. lata glabra. Folia opposita tenuiter membranacea ovato-triangularia 7–9 cm. longa 4–4½ cm. lata apice acuminata basi late truncata vel leviter cordata margine præter basin acumenque crenato-dentata, dentibus obtusissimis vel semi-rotundatis ascendentibus, supra glabra subtus tenuiter hirsuta impresso-punctata, subtus pallidiora, petiolis 2–3 cm. longis. Racemi terminales cylindrici, verticillastris a se 1–2 cm. remotis sursum plus approximatis, pedunculis racemorum 3–4 cm. longis, verticillastris sessilibus vel pedunculatis 5–10-floratis, pedicellis ½–1 mm. longis glabris. Calyx tubuloso-campanulatus tenuiter hirsutus vel glaber 7 mm. longus 3 mm. latus 15-nervatus apice 5-lobatus, lobis oblongo-triangularibus 3 mm. longis 1½ mm. latis apice acuminatis secus marginem et medium costatis basi haud contractis intus glabris. Corolla tubulosa sursum 7 mm. longa 2–3 mm. lata apice breviter extus brevissime hirsuta 2-labiata, labro superiore late rotundato 2 mm. lato 1 mm. longo apice 2-lobato, lobis ½ mm. longis, labro inferiore latissimo 3-lobato, lobo medio latissime rotundato 3 mm. lato 1½ mm. longo apice rotundato vel tenuiter emarginato basi contracto, lobis lateralibus minutis late rotundatis ½ mm. longis. Stamina 4 didynama, anterioribus longioribus, erecta supra labrum superius exserta, antheris glabris oblongis, loculis parallelis, filamentis glabris, stylo validiusculo apice breviter 2-fido, ramis subæquilongis. Ovarium 4-partitum, partibus obovoideis apice hirsutis vel pilis fasciculatis instructis. Discus sub ovario annularis ½ mm. altus anteriore elevatus.

HAB. Suisha, Shūshūgai, leg. C. OWATARI, Jan. 1898.

Differs from *L. rugosus*, by the much longer calyx and corolla. According to BRIQUET (in Pflanzenfamilien IV-3 a, p. 233), *Agastache* is separated from *Lophanthus* by the position of stamens. In the former, the posterior stamens are descending, while the anterior ones are ascending; in the latter genus, the posterior stamens are ascending, while the anterior ones more or less straight-patent. In my opinion, however, these differences in the position of stamens are not to be regarded as a sufficient character by which the two genera may



be separated. *Agastache* should, therefore, be included in *Lophanthus*, unless any other character is found to justify the separation of the two genera.

***Glecoma* LINN. (= *Glechoma* LINN.)**

***Glecoma hederacea* LINN.; HAYATA l. c. p. 57.**

NOTE: The generic name *Glecoma* is older than *Glechoma*.

***Brunella* LINN. (= *Prunella* LINN.)**

***Brunella vulgaris* LINN.; HAYATA l. c. p. 57.**

NOTE: The generic name *Brunella* is older than *Prunella*.

***Leucas* BENTH.**

*Key to species.*

Leaves smaller, bracts lanceolate very small. ....1. *L. takaensis*.

Leaves larger, bracts linear longer. ....2. *L. mollissima*.

1. ***Leucas takaensis* HAYATA sp. nov.** Perennis suffruticosa, caulis basi procumbens sursum erectus minute depresso-hirsutus tetragonus. Folia opposita ovata triangulari-ovata  $1\frac{1}{2}$ –1 cm. longa 8–13 mm. lata apice obtusissima vel rotundata basi truncata vel cuneata margine crenis 1–2 utroque latere instructa, crenis semi-rotundatis, supra sparse subtus dense depresso-velutinoso chartacea, petiolis 5–8 mm. longis. Flores ad axillas 5–10 congesti, pedicellis 1–2 mm. longis hirsutis, pilis ascendenti-recurvis. Calyx tubuloso-campanulatus 6 mm. longus 3–4 mm. latus extus hirsutus 10–12 costatus intus tenuiter hirsutus apice 5-dentatus, dentibus acuminato-triangularibus  $1\frac{1}{2}$ –2 mm. longis 1 mm. latis acuminatis medio costatis margine ciliolatis, inter dentes setula vel denticulo instructus, denticulis  $\frac{1}{2}$  mm. longis. Corolla longe exserta 12 mm. longa, tubo 7–8 mm. longo 1 mm. lato extus glabro intus medio hirsuto-annulato, limbo 2-labiato, labro superiore galeiformi oblongo 4 mm. longo  $2\frac{1}{2}$  mm. lato apice rotundato extuse dense hirsuto ad marginem densissime fasciculato-piloso, pilis rectis validiusculis albis 1 mm. longis, intus subglabro, labro inferiore in ambitu obtriangulari 4 mm. longo 5 mm. lato utraque facie glabro, lobo medio obcordato 3 mm. longo 4 mm. lato apice emarginato basi cuneato-

angustato margine subintegro, utraque pagine glabro, lobis lateralibus semi-oblongis 3 mm. longis apice rotundatis. Stamina 4 didynama, anterioribus longioribus, fauce tubi corollæ oriunda, filamentis glabris sub galea ascendentibus erectis, antheris glabris, loculis divaricatis confluentibus. Stylo glabro apice 2-fido, ramo anteriore longiore 2mm. longo deorsum leviter recurvo, ramo posteriore 1 mm. longo. Ovarium 4-partitum glabrum apice truncatum. Discus infra ovarium situs  $\frac{1}{2}$  mm. altus anteriore glandula brevissima instructus.

*Leucas lanata* HAYATA Gen. Ind. p. 57, (non BENTH.).

HAB. Takao, Shōryūkiūtō.

Near *L. lanata* BENTH.; but distinguishable from it by the very small lanceolate bracts and in the much smaller leaves.

2. ***Leucas mollissima*** WALL.; HAYATA Gen. Ind. p. 57.

*L. javanica* HAYATA Gen. Ind. p. 57, (non BENTH.).

### *Lamium* LINN.

#### *Key to species.*

1. Anthers tufty hairy. ....1. *L. amplexicaule*.  
Anthers slightly hairy or entirely glabrous. ....2.
2. Anthers slightly hairy. ....3.  
Anthers glabrous. ....4.
3. Calyx thinly hirsute. ....2. *L. uraiense*.  
Calyx densely hirsute. ....3. *L. formosanum*.
4. Leaves rhombic or triangularly ovate 2-3 cm. long. ....4. *L. kelungense*.  
Leaves oblong oblong-lanceolate nearly 20 cm. long. ....5.
5. Leaves nearly entire. ....5. *L. longepetiolata*.  
Leaves dentate. ....6. *L. gesneroides*.

*Lamium chinense* BENTH. var. *parviflora* HEMSL.; HAYATA l. c. p. 57.

NOTE: The variety may be a form of *Lamium kelungense* HAYATA newly described in the present volume.

1. ***Lamium amplexicaule*** LINN.; HAYATA l. c. p. 57.

2. ***Lamium uraiense*** HAYATA sp. nov. Herba annua? basi fruticosa,

caulis 30–40 cm. longus erectus rectus hirsutus. Folia opposita membranacea oblonga vel ovato-oblonga 9 cm. longa  $3\frac{1}{2}$  cm. lata apice acuminata basi subito cuneata ad petiolum attenuata margine præter basin et acumen serrata, basi et acumine integro, supra tenuissime hirsuta vel subglabra subtus subglabra, subtus pallidiora, petiolis circ. 1 cm. longis. Flores ad axillas foliorum oppositorum glomerati, pedicellis 2–3 mm. longis, bracteis minutis vel obsoletis. Calyx oblique campanulatus plus minus declinatus 8 mm. longus 5 mm. latus extus breve hirsutus intus glaber 5-dentatus, dentibus triangularibus cuspidiformibus, cuspidibus 2 mm. longis. Corolla oblique campanulata 1 cm. longa  $\frac{1}{2}$  cm. lata extus hirsuta intus glabra basi hirsuto-annulata, tubo 5 mm. longo versus apicem dilatato, fauce ampliata, labro superiore oblongo 5 mm. longo 4 mm. lato extus hirsuto intus glabro, apice alte 2-lobato, lobis oblongis  $2\frac{1}{2}$  mm. longis totiusque latis apice rotundatis, labro inferiore patenti 3-lobato, lobo medio oblongo-rotundato valde concavo 3 mm. longo  $2\frac{1}{2}$  mm. lato, lobis lateralibus brevioribus oblique rotundatis. Stamina 4 didynama apice tubi affixa, posteriora breviora, anteriora longiora, filamentis complanatis hirsutis, antheris rotundato-cordatis plus quam 1 mm. longis et latis pilis 2–5 instructis, loculis subparallelis. Stylus 8 mm. longus glaber apice 2-fidus, ramo inferiore  $\frac{1}{2}$  mm. longo, longiore quam ramo superiore. Ovarium glabrum truncatum 4-partitum, partibus lævibus apice truncatis. Discus infra ovarium situs integer, glandis haud instructis.

HAB. Uraisha, leg. H. INABA, Juli. 1911.

3. **Lamium formosanum** NAKAI; HAYATA Gen. Ind. p. 98. *Ajuga formosana* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 318.

HAB. Kappanzan, Funsui, Biōritsu—Taiko.

Floral structure of this species is nearly the same as that of *Matsumurella* and *Ajugoides* (MAKINO in Tōkyō Bot. Mag. XXIX. pp. 279–283) which nearly quite agree with *Lamium*.

*Stenokalamos* HAYATA subgen. nov.

Corollæ tubus exsertus angustatus basi leviter arcuatus vel rectus fauce minus ampliatus intus piloso-annulatus; limbus 2-labiatus, labro postico erecto concavo, antico patenti haud appendiculato; anthera haud hirsuta.

Resembles *Orvala* and *Galeobdolon* in the glabrous anthers, but distin-



guishable from them in the not much ampliate throat of the corolla-tubes. The new subgenus is much nearer to *Galeobdolon* than to *Orvala*, and perhaps should be united to the former, when the floral structures are more fully known. *Matsumurella* and *Ajugoides* recently established by Mr. T. MAKINO are perhaps to be referable to the new subgenus or to *Galeobdolon*.

4. **Lamium** (§ *Stenokalamos*) **kelungense** HAYATA sp. nov. (Pl. XII.)  
 Annua basi procumbens sursum erecta, partibus caulis erectis 5–10 cm. longis toto tenuiter villosis. Folia opposita membranacea triangulari-rotundata vel oblonga  $3\frac{1}{2}$ –3 cm. longa 3– $2\frac{1}{2}$  cm. lata apice obtusa basi late truncata vel late cuneata margine crenato-serrata, serris obtusissimis, supra tenuiter hirsuta subtus villosa, petiolis 1–3 cm. longis hirsutis. Flores ad axillas foliorum 4–5-glomerati subsessiles, bracteis oblanceolatis 6–7 mm. longis hirsutis. Calyx hirsutus campanulatus 7 mm. longus 7 mm. latus extus dense hirsutus intus laxè hirsutus vel subglaber 5-lobatus, lobis subæqualibus lanceolato-triangularibus  $3\frac{1}{2}$  mm. longis 2 mm. latis apice acuminatis brevè aristatis ad marginem et ad medium nervatis margine ciliatis. Corolla albo-rosea  $1\frac{1}{2}$ –2 cm. longa basi glabra sursum extus hirsuta, tubo 5–6 mm. longo 1–2 mm. lato sursum leviter dilatato, limbo 2-labiato, labro superiore erecto 10 mm. longo obovato-oblongo 1 cm. longo 6 mm. lato apice tenuiter emarginato basi leviter contracto margine ciliato extus longe hirsuto intus subglabro, labro inferiore horizontaliter patenti obovato-oblongo 1 cm. longo 8 mm. lato 3-lobato, lobo medio late rotundato 5 mm. longo 1 cm. lato extus subglabro intus glabro apice truncato vel leviter emarginato margine undulato, lobis lateralibus obliquis semi-oblongis interiore falcatis apice rotundatis, tubo intus glabro supra basi annulariter hirsuto. Stamina 4 didynama, anteriora longiora, erecta recta apice recurva sub lobo posteriore ascendente, filamentis glabris complanatis, antheris glabris, loculis divaricatis oblongis, stylo glabro erecto apice deorsum recurvo 2-fido, ramis subæqualibus. Ovarium glabrum 4-partitum, partibus apice truncatis.

Descriptio aucta: Flores albi vel plus minus roseastri; labium intus purpureo-maculatum, maculis linearibus; antheræ fusco-atro-purpureæ latere exteriori glandulis albis globosis sessilibus basi circ. 10 conspersæ. Pollinia alba.

HAB. Kelung: Senton, leg. B. HAYATA, Mai. 1916.

Very near *Matsumurella stolonifera* MAKINO; but differs from it by the

much more hirsute leaves.

5. **Lamium** (*Stenokalamos*) **longepetiolata** HAYATA sp. nov. Herba erecta 60–70 cm. longa, caulis subglaber tetragonus 6 mm. latus. Folia opposita longe petiolata membranacea oblonga vel oblongo-lanceolata 23 cm. longa 8 cm. lata apice acuminata basi obtusa vel obtusissima margine subintegra erosa mucronibus minutis remote instructa utraque glabra subtus pallidiora, venis lateralibus primariis utroque latere costæ 5–6 angulo 30° a costa egressis, petiolis 7 cm. longis. Verticillastri axillares sessiles 10–20 florati multi-bracteati, bracteis spathulatis linearibus 10–15 mm. longis 2–3 mm. latis apice cuspidatis hirsutis. Calyx extus dense hirsutus tubuloso-campanulatus 13 mm. longus sursum 8 mm. latus ad os 5-lobatus, lobis triangularibus apice aristato-acuminatis cum acumine 4 mm. longis 2–3 mm. latis subæqualibus, intus sursum tenuiter hirsutus deorsum glaber. Corolla tubulosa apice dilatata 2 cm. longa extus basi deorsum glabra sursum densissime hirsuta intus glaberrima ad medium tubi hirsuto-annulata, tubo 12 mm. longo 2–3 mm. lato, limbo subito ampliato 2 labiato, labro superiore erecto oblongo 6 mm. longo 4 mm. lato apice brevissime 2-lobato vel emarginato basi haud contracto intus glabro extus dense hirsuto, labro inferiore late rotundato 8 mm. longo 10 mm. lato 3-lobato, lobo medio late rotundato 4 mm. longo 6 mm. lato margine denticulato, lobis lateralibus oblongis latere interiore 3 mm. longo latere exteriori 8 mm. longo margine integris. Stamina 4 didynama, anterioribus longioribus, filamentis hirsutis complanatis e fauce corollæ oriundis sub labro posteriore ascendentibus erectis, antheris glabris, loculis divaricatis late rotundatis basi glanduloso-verrucosis. Stylo glabro apice 2-fido, ramis æqualibus  $\frac{1}{2}$  mm. longis. Ovarium glabrum apice truncatum.

HAB. Kōshūn: Kuraru, leg. H. INABA.

6. **Lamium** (*Stenokalamos*) **gesneroides** HAYATA sp. nov. Herba annua? stolonifera; caulis 30–40 cm. longus erectus rectus subglaber a basi usque ad medium efoliatus sursum foliatus. Folia oblonga 18 cm. longa 8 cm. lata apice acuta vel acuminata basi acuta membranacea margine dentato-serrata, serris triangularibus ascendentibus apice mucronibus instructis, supra tenuissime sparsissimeque hirsuta subtus glabra, venis lateralibus primariis utroque latere costæ 7–8 angulo acuto a costa egressis, petiolis 2 cm. longis. Verticillastri 10–13-



florati sessiles axillares multi-bracteati, bracteis linearibus vel spathulatis 1 cm. longis latis hirsutis apice acuminato-aristatis. Calyx sessilis tubuloso-campanulatus extus dense hirsutus intus glaber 8 mm. longus 5-costatus apice 5-dentatus, dentibus triangularibus 2 mm. latis apice arista instructis cum arista 2 mm. longis. Corolla tubuloso-campanulata basi extus glabra sursum extus densissime hirsuta intus toto glabra, sed ad medium tubi hirsuto-annulata, tubo 1 cm. longo 2 mm. lato, limbo 2-labiato, labro superiore erecto obovato-oblongo 8 mm. longo 5 mm. lato apice emarginato basi haud vel tenuiter contracto, labro inferiore horizontaliter patenti late rotundato 8 mm. longo totiusque lato 3-lobato, lobo medio rotundato-triangulari 5 mm. lato 5 mm. longo apice triangulari-acuto margine subintegro, lobis lateralibus oblongis. Stamina didynama, anterioribus longioribus, filamentis complanatis hirsutis, antheris late reniformibus, loculis glabris lævibus divaricatis plus minus confluentibus. Ovarium glabrum apice truncatum, stylo glabro apice 2-fido, ramis  $\frac{1}{2}$  mm. longis, anteriore longiore.

HAB. Loco non indicato, leg. T. SōMA.

Near *L. longepetiolata* HAY.; but differs from it in the dentate leaves, in the acute middle lobe of the lower lip, and in the not verrucous anthers.

### *Leonurus* LINN.

**Leonurus sibiricus** LINN.; HAYATA Gen. Ind. p. 57.

### *Stachys* LINN.

#### *Key to species.*

1. Leaves smaller, at most 3 cm. in length.....1. *S. leptopoda*.  
   Leaves larger, at least 6 cm. in length. ....2.
2. Leaves petiolate. ....2. *S. oblongifolia*.  
   Leaves nearly sessile. ....3. *S. subargentea*.

1. **Stachys leptopoda** HAYATA sp. nov. Herba annua pauce ramosa vel simplex circ. 30 cm. longa; caulis tetragonus tenuiter villosus a basi sursum foliatus. Folia membranacea lineari-lanceolata 3 cm. longa 7 mm. lata apice obtusa basi truncata utraque pagine tenuiter villosa margine crenulato-serrata,



petiolis foliorum inferiorum longioribus 1 cm. longis superiorum brevioribus interdum ad nullum reductis villosis. Spicæ verticillastrorum terminales simplices, bracteis inferioribus cum foliis conformibus superioribus minoribus ad nullum reductis, verticillastris inferioribus a se 3 cm. remotis, superioribus plus approximatis. Calyx campanulatus 6–7 mm. longus 4–5 mm. latus extus patento-hirsutus intus sursum hirsutus basi glaber apice 5-lobatus, lobis triangularibus  $2\frac{1}{2}$  mm. longis apice acuminatis medio costatis, costis apice ad aristam productis secus margines nervatis. Corollæ tubus 6 mm. longus fauce 2 mm. latus extus subglaber intus medio sursum hirtellus, limbo 2-labiato, labro superiore obovato  $3\frac{1}{2}$  mm. longo 3 mm. lato apice subtruncato extus hirsuto intus glabro, labro inferiore oblongo 7 mm. longo 4 mm. lato tenuiter 3-lobato, lobo medio rotundato 3 mm. longo totiusque lato apice rotundato basi contracto, extus hirsuto intus glabro, lobis lateralibus subtriangularibus obtusis latis. Stamina 4 sub-æquilonga sub labro superiore ascendentia, antheris glabris, loculis valde divaricatis subconfluentibus, filamentis hirsutis. Stylus glaber apice breve 2-fidus, ramis æquilongis  $\frac{1}{4}$  mm. longis. Ovarium glabrum, partibus ovoideis. Discus haud in glandam tumens.

HAB. Akō: leg. T. KAWAKAMI, Aprili. 1905.

Near *Stachys oblongifolia* BENTH.; but distinguishable from it by the much smaller and slenderer form with much smaller leaves and flowers.

2. **Stachys oblongifolia** BENTH.; HAYATA l. c. p. 58.

3. **Stachys subargentea** HAYATA sp. nov. Herba annua 40–50 cm. longa erecta basi pauce ramosa; caulis tetragonus tenuiter villosus, pilis descendentibus. Folia opposita subsessilia vel breve petiolata lineari-lanceolata 7 cm. longa  $1\frac{1}{2}$  cm. lata apice obtusa vel obtusissima margine crenato-serrata basi truncata supra tenuiter molleque villosa subtus dense molleque villosa albicantia, petiolis brevissimis 1–3 mm. longis; foliis superioribus sessilibus. Verticillastri spicatin superpositimque dispositi, spicis terminalibus simplicibus 10–12 cm. longis, bracteis inferioribus cum foliis conformibus sessilibus, superioribus gradatim minoribus ad 2 mm. in longitudine reductis, verticillastris inferioribus a se 2–3 cm. remotis superioribus gradatim approximatis. Calyx campanulatus extus intusque dense villosus 7 mm. longus totiusque latus 5-lobatus, lobis triangularibus 2 mm. longis et latis apice acuminatis ad aristam productis medio

costatis. Corollæ tubus 6 mm. longus fauce 3 mm. latus medio intus hirsuto-annulatus extus subglaber, limbo 2-labiato extus hirsuto intus glabro, labro superiore obovato 4 mm. longo  $2\frac{1}{2}$  mm. lato apice rotundato basi haud vel vix contracto margine ciliolato, labro inferiore obovato 8 mm. longo ascendenti-patenti 3-lobato, lobo medio subcordato 4 mm. longo apice rotundato basi contracto margine haud ciliolato, lobis lateralibus oblongis 2 mm. latis obtusis. Stamina 4 æquilonga, filamentis hirsutis, loculis valde divaricatis subconfluentibus. Stylus glaber apice 2-fidus, ramis æquilongis  $\frac{1}{4}$  mm. longis. Ovarium glabrum, partibus ovoideis. Discus haud vel vix in glandam tumens.

HAB. Biōritsu, leg. Y. SHIMADA, Mart. 1909.

Near *Stachys oblongifolia* BENTH.; but differs from it by the nearly sessile leaves. This is perhaps the same species which was formerly recorded as *Stachys oblongifolia* BENTH. from the island.

### *Anisomeles* R. BR.

**Anisomeles ovata** R. BR., HAYATA Gen. Ind. p. 56.

### *Salvia* LINN.

#### *Key to species.*

- |                                   |    |
|-----------------------------------|----|
| 1. Flowering stem not leafy ..... | 2. |
| Flowering stem leafy.....         | 5. |

**Stachys Tashiroi** HAYATA sp. nov. Herba annua; caulis simplex 40–50 cm. longus glaber tetragonus. Folia opposita membranacea lanceolata vel lineari-lanceolata 5–6 cm. longa 1 cm. lata apice acuta vel acuminata basi late obtusissima vel obtusa margine serrulata; utraque pagine glabra subtus pallidiora, petiolis 2–5 mm. longis glabris. Verticillastri racemosim superpositimque dispositi, racemis terminalibus simplicibus 10–15 cm. longis, verticillastris a se 5 mm.—20 mm. remotis, bracteis inferioribus cum foliis conformibus superioribus minoribus usque ad nullum reductis, pedicellis 1 mm. longis tenuiter hirsutis. Calyx campanulatus 5 mm. longus totiusque latus extus glaber intus glaber apice 5-lobatus, lobis triangularibus  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice acuminatis secus marginem et medium costatis margine glanduloso-ciliolatis. Corollæ tubus 6 mm. longus fauce 3 mm. latus supra basin latere anteriore subito contractus sursum dilatatus extus subglaber vel tenuiter hirsutus intus prope basin hirsuto-annulatus, limbo 2-labiato, labro superiore erecto obovato 4–5 mm. longo 4 mm. lato apice rotundato vel obtuso concavo, labro inferiore obtriangulari 7–8 mm. longo 7 mm. lato transverse patenti 3-lobato, lobis lateralibus oblique triangularibus 2 mm. longis apice rotundato-obtusis, lobo medio oblongo 5 mm. longo apice rotundato. Stamina 4 æquilonga, sub labro superiore ascendentia, filamentis hirsutis. Stylus apice 2-ramosus, ramis æquilongis  $\frac{1}{4}$  mm. longis. Ovarium glabrum, partibus obovoideis.

HAB. Okinawa, leg. Y. TASHIRO, Mai. 1887.

Near *Stachys aspera*; but distinguishable from it in having much narrower leaves and smaller flowers.



2. Leaves simple .....1. *S. scapiformis*.  
 Leaves compound .....3.  
 3. Hairs on scapes glandular .....2. *S. Hayatana*.  
 Hairs on scapes not glandular.....4.  
 4. Leaflets cordate or rounded at the base .....3. *S. keitaoensis*.  
 Leaflets mostly cuneate at the base.....4. *S. arisanensis*.  
 5. Leaves compound .....5. *S. Tashiroi*.  
 Leaves simple .....6.  
 6. Leaves oblong or oblong-spathulate .....6. *S. plebeia*.  
 Leaves triangular-hastate.....7. *S. formosana*.

1. **Salvia scapiformis** HEMSL. (Fig. 34-i, j.) HEMSL. Ind. Fl. Sin. II. p. 287; Bot. Mag. t. 6980.

HAB. Kelung.

Curious to say, our collections of the species come only from Kelung, although the species is recorded from Tamsui. It seems that the species is limited in the northern part of the island. It is also recorded from Szechuen of Central China, of which locality, however, I am very sceptical.

2. **Salvia Hayatana** MAKINO n. n. (Fig. 34-d-h).

*Salvia scapiformis* HANCE var. *pinnata* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 312, t. 17, (pro parte).

HAB. Urai; Taitō: Daikōkō. Distinguishable from *S. scapiformis*, *S. keitaoensis* and *S. arisanensis* by the glandular hairs on flowers and peduncles.

3. **Salvia keitaoensis** HAYATA sp. nov. (Fig. 34-a-d). Herba perennis, rhizomatibus erectis; caulis 25-40 cm. longus ad basin foliatus sursum basi efoliatus sursum spiciformis subglaber vel minute hirsutus. Folia omnia radicalia vel basalia pinnata in ambitu oblonga 7 cm. longa 3 cm. lata, foliolo terminali ovato vel ovato-cordato 3-3½ cm. longo 2-3 cm. lato apice obtuso basi cordato membranaceo margine serrato, serris obtusissimis utraque pagine subglabro, petiolulo terminali 1 cm. longo hirsuto, foliolis lateralibus 2-3-jugis, jugis 1-1½ cm. a se remotis, multo minoribus ovatis vel ovato-cordatis 1-1½ cm. longis breve petiolulatis, petiolis communibus 3-4 cm. longis hirsutis, pilis longiusculis patentissimis. Spicæ verticillastrorum simplices rarius a basi ramosæ 8-25 cm. longæ, verticillastris inferioribus a se 3 cm. remotis superio-



ribus plus approximatis, bracteis minutis oblanceolatis  $1\frac{1}{2}$  mm. longis, pedicellis 1–2 mm. longis minute hirsutis. Calyx tubuliformi-campanulatus 5 mm. longus 3 mm. latus 2-labiatus, labro superiore triangulari 2 mm. longo plus minus recurvo apice 2-denticulato 3-carinato ad carinas angustissime alato glabro, labro inferiore recto triangulari 2 mm. longo 7-nervio apice 2-lobato, lobis acute triangularibus 1 mm. longis; calyx intus medio hirsutus. Corolla tubuloso-campanulata 7–8 mm. longa extus glabra 2-labiata, labro superiore erecto 3 mm. longo 3 mm. lato apice 2-lobato, lobis rotundatis margine plus minus ciliatis, labro inferiore 2 mm. longo 3-lobato, lobis lateralibus rotundatis  $1\frac{1}{2}$  mm. longis, lobo medio 2 mm. lato 1 mm. longo truncate; corollæ tubo medio intus hirsuto. Stamina perfecta 2, filamentis filiformibus 3 mm. longis, connectivis erectis rectis 4 mm. longis, parte superiore 3 mm. longa loculifera, parte inferiore brevissima  $\frac{1}{2}$  mm. longa haud loculifera; loculis antherarum singulis  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis. Stylus filiformis 8 mm. longus basi subito angulo recto recurvus subito erectus glaber apice 2-lobatus, lobo anteriore longiore 1 mm. longo, lobo inferiore brevissimo  $\frac{1}{4}$  mm. longo. Ovarium glabrum, partibus obovoideis 1 mm. longis. Discus infra ovarium  $\frac{1}{2}$  mm. longus. Achæ-nium glabrum elongato-oblongum  $1\frac{5}{8}$  mm. longum  $\frac{5}{8}$  mm. latum apice obtusum, partibus dorsali subplanis ventrali prismaticis triangularibus in sectione.

*S. scapiformis* HANCE var. *pinnata* HAYATA Gen. Ind. p. 58.

HAB. Keitao, ad 4000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *S. scapiformis* HANCE, but differs from it by the pinnate hirsute leaves. The leaves of *S. scapiformis* are always simple and glabrous. There are also differences between the flowers of the new and the latter species. Consequently, I should think it better to regard them to be specifically different.

4. **Salvia arisanensis** HAYATA sp. nov. (Fig. 34–k–m). Herba perennis; rhizoma erectum; caulis 30–20 cm. longus simplex subglaber vel minute hirsutus basi foliatus cæterum efoliatus. Folia omnia radicalia vel basalia membranacea pinnata in ambitu obovata vel oblonga 6 cm. longa 3 cm. lata 5–7-foliolata, foliolo terminali oblongo 3 cm. longo 2 cm. lato apice acuto-obtuso basi cuneato rotundato rarissime cordato margine serrato, serris obtusis, supra sparse hirsuto subtus pallidiore ad costas venasque dense hirsuto, petiolulo 5–10 mm. longo, foliolis lateralibus multo minoribus oblongo-ovatis obliquis  $1\frac{1}{2}$  cm. longis,

petiolis cōmmunibus 4–5 cm. longis patenti-hirsutis. Spicæ verticillastrorum simplices rarius basi ramos emittentes, verticillastris inferioribus 3–4 cm. a se remotis superioribus plus approximatis 5–2-floratis, bracteis minutis lanceolatis 2–3 mm. longis. Calyx tubulosus 6–7 mm. longus extus subglaber 3 mm. latus 2-labiatus, labro superiore triangulari 2 mm. longo 3 mm. lato apice plus minus cuspidato-acuto, labro inferiore triangulari 3 mm. longo apice alte 2-lobato, lobis acuto-triangularibus 2 mm. longis apice acutis; (calyx intus medio tenuiter barbatus extus subglaber); labro superiore 3-carinato ad carinas laterales subalato, labro inferiore 3-nervio vel cum nervis secundariis 7–8-nervio. Corolla campanulato-tubuliformis 1 cm. longa ad faucem 4 mm. lata extus dense hirsuta intus paucè hirsuta, labro superiore 4 mm. longo 2-lobato, lobis oblongis 4 mm. longis 2 mm. latis apice obtusis, labro inferiore 3-lobato, lobis lateralibus triangularibus rotundatis 2 mm. longis totiusque latis, lobo medio oblongo 2 mm. longo apice obtuso. Stamina perfecta 2 e basi labri inferioris oriunda, filamentis 2 mm. longis glabris, connectivis 3 mm. longis, loculo antheræ altro lineari  $1\frac{1}{2}$  mm. longo altro nullo; corollæ tubus intus hirsutus; stylus glaber 9 mm. longus. Ovarium glabrum, partibus ovoideis; discus anteriore ad glandulam vix tumens.

HAB. Arisan, leg. B. HAYATA, Aprili. 1912. Differs from *S. keitaoensis* by the much hirsute leaflets with much larger teeth.

5. **Salvia Tashiroi** HAYATA sp. nov. Caulis erectus rectus tetragonus 100 cm. longus medio  $2\frac{1}{2}$  mm. latus glaber. Folia radicalia cum petiolis 6–7 cm. longa pinnata, pinnis 3 minoribus; caulina longiora, media longissima cum petiolis 13 cm. longa 7 cm. lata 3-foliolata, foliolo terminali rhomboideo-ovato  $4\frac{1}{2}$  cm. longo 3 cm. lato apice acuto basi late cuneato vel obtuso vel truncato margine serrato chartaceo utraque pagine glabro, petiolulo terminali  $1\frac{1}{2}$  cm. longo, foliolis lateralibus sessilibus vel brevissime petiolulatis ovato-oblongis  $3\frac{1}{2}$  cm. longis  $2\frac{1}{2}$  cm. latis basi valde obliquis apice obtusis vel acutis, petiolis communibus 6–7 cm. longis; folia superiora simplicia. Inflorescentia terminalis 20 cm. longa vel axillaris. Verticillastri 5–7-florati, floribus sessilibus vel brevissime pedicellatis. Calyx tubulosus 5 mm. longus  $2\frac{1}{2}$  mm. latus 2-labiatus, labro superiore semi-rotundato 2 mm. longo 3 mm. lato apice breve mucronato 3-nervio ad nervos laterales alato, alis  $\frac{1}{3}$  mm. latis,



labro inferiore late triangulari 2 mm. longo 3 mm. lato 6-nervio apice alte 2-lobato, lobis cuspidato-acutis; calyx extus glanduloso-hirsutus intus ad faucem dense longeque hirsutus. Corolla 11 mm. longa 3 mm. lata tubuliformis extus breve hirsuta 2-labiata, labro superiore oblongo 4 mm. longo  $1\frac{1}{2}$  mm. lato apice truncato ad centrum plus minus emarginato erecto, labro inferiore 3 mm. longo 3-lobato, lobis lateralibus semi-rotundatis minoribus 1 mm. longis totiusque latis, lobo medio late cuneato 2-3 mm. longo 5 mm. lato apice 2-lobato, lobis magnis divaricatis patentibus. Stamina perfecta 2 intra faucem latere anteriore oriunda, filamentis complanatis  $1\frac{1}{2}$  mm. longis, connectivis 4 mm. longis, parte superiore 3 mm. longa valida loculifera, parte inferiore brevissima 1 mm. longa haud loculifera, loculis antherarum linearibus  $1\frac{1}{2}$  mm. longis. Stylus glaber 12 mm. longus. Ovarium glabrum, partibus obovoideis  $\frac{1}{2}$  mm. longis.

*Salvia plectranthoides* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 311 (non GRIFF.)

HAB. Kōshūn, leg. Y. TASHIRO, Aprili. 1896.

6. **Salvia plebeia** R. BR., HAYATA l.c. p. 58.

7. **Salvia formosana** HAYATA sp. nov. Herba perennis? Caulis simplex erectus 60 cm. longus ad inflorescentiam plus minus ramosus breve hirsutus versus medium multo-foliatus. Folia longe petiolata opposita ad medium caulis approximativim disposita membranaceo-chartacea triangulari-hastata 13-7 cm. longa 10-5 cm. lata apice subito cuspidato-acuminata basi hastata, lobis lateralibus hastæ apice cuspidato-acutis, margine serrulata supra primum hirsuta demum subglabra subtus ad costas nervos hirsuta cæterum subglabra, petiolis 12-7 cm. longis hirsutis vel subglabris. Racemi verticillastri erecti basi paucè ramosi vel simplices 10-20 cm. longi, verticillastri inferioribus a se 2 cm. remotis superioribus plus approximatis, bracteis ovatis inferioribus 1 cm. longis superioribus multo minoribus hirsutis vel subglabris; pedicellis 2 mm. longis hirsutis vel barbatis. Calyx oblique campanulatus 8-9 mm. longus 7-8 mm. latus extus longe barbatus rubro- vel flavo-punctatus 2-labiatus, labro superiore late triangulari 2 mm. longo 5 mm. lato apice breve cuspidato 3-nervio ad nervos laterales angustissime alato, labro inferiore triangulari 5 mm. lato totiusque longo apice alte 2-lobato, lobis 3 mm. longis triangulari-acuminatis;



calyx 15-nervatus intus glaber. Corolla 2 cm. longa flava, tubo 7 mm. longo infra medium contracto, extus basi glabra sursum hirsuta 2-labiata, labro superiore erecto lineari 1 cm. longo 4 mm. lato apice breve 2-lobato minute rubropunctato intus ad latus basis labri superioris longe barbato; labro inferiore oblongo 8 mm. longo apice 3-lobato, lobis lateralibus semi-oblongis, lobo medio 3 mm. longo  $3\frac{1}{2}$  mm. lato apice truncato; corolla intus basi hirsuto-annulata. Stamina perfecta 2, filamentis complanatis 4 mm. longis  $\frac{3}{4}$  mm. latis, connectivis linearibus, partibus superioribus 6 mm. longis loculiferis, partibus inferioribus 3 mm. longis sterilibus, loculis antherarum oblongo-linearibus 5 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi rotundatis. Stylus filiformis 3 mm. longus sursum deorsum recurvus apice 2-ramosus, ramo superiore 2 mm. longo, ramo inferiore longiore 3 mm. longo. Ovarium glabrum, partibus complanato-ovoideis  $\frac{2}{3}$  mm. longis; discus pulviniformis  $1\frac{1}{2}$  mm. latus 1 mm. longus.

HAB. Heirinbi, Giran, Shintiku, Ritōzan.

Differs from *S. nipponica* MIQ. by the subglabrous leaves and in the minute red dots on the corolla.

**Salvia omerocalyx** HAYATA sp. nov. Herba perennis. Rhizoma erectum; caulis erectus 40-20 cm. longus basi dense approximateque foliatus glaberrimus simplex sursum spiciformis. Folia omnia radicalia vel basalia longissime petiolata glaberrima pinnata, rarius simplicia, foliolis 3-5, foliolo terminali oblongo vel oblongo-ovato vel subrotundato  $3\frac{1}{2}$ -3 cm. longo membranaceo apice obtuso basi rotundato vel tenuiter cordato margine crenato, petiolulo terminali 3-5 mm. longo, foliolis lateralibus multo minoribus oblongis ovatis vel cordatis 1-2 cm. longis petiolulatis, petiolis communibus 8-10 cm. longis glabris. Spicæ verticillastri 5-15 cm. longæ; rhachis tenuiter hirsutis, verticillastri inferioribus a se 1-1.5 cm. remotis, superioribus plus approximatis 5-6-floratis, bracteis minutis. Calyx tubuloso-dilatatus 6 mm. longus 2-labiatus extus sparse glanduloso-hirtellus, labro superiore lato triangulari 2 mm. longo  $2\frac{1}{2}$  mm. lato apice acuto ad summum brevissime 3-dentato, labro inferiore late triangulari 2 mm. longo  $2\frac{1}{2}$  mm. lato apice acuto ad summum alte 2-lobato, lobis triangularibus apice acuminatis; calyx tenuiter 10-costatus latere dorsali 2-alato-carinatus ad carinas glanduloso-ciliolatus. Corolla 1 cm. longa, tubus 5 mm. longus 2 mm. latus extus subglaber intus medio hirsuto-annulatus, limbo extus sparse glanduloso-hirtello intus glabro 2-labiato, labro superiore erecto concavo oblongo 5 mm. longo 4 mm. lato apice emarginato basi plus minus contracto, labro inferiore majore 3-lobato, lobo medio late obovato 2 mm. longo 3 mm. lato apice retuso, lobis lateralibus oblongis 2 mm. longis  $1\frac{1}{2}$  mm. latis patentibus. Stamina anteriora perfecta 2 ad faucem corollæ affixa, filamentis brevioribus glabris 2 mm. longis, connectivis longissimis cum filamento articulatis, partibus anterioribus 5-6 mm. longis apice loculum polleniferum gerentibus, partibus posterioribus brevissimis 2 mm. longis haud loculigeris, loculis polleniferis linearibus 2 mm. longis  $\frac{1}{4}$  mm. latis. Stamina anteriora fere obsoleta, filamentis 1 mm. longis haud antheriferis. Stylus longe exsertus apice 2-fidus, ramo anteriore longiore 2 mm. longo, posteriore brevi  $\frac{1}{2}$  mm. longo. Discus anteriore plus minus tumens. Ovarium glabrum, partibus ellipsoideis.

HAB. Tajima, Hattamura, leg. G. KOIZUMI, V. 1914.

Somewhat near to *S. scapiformis* HANCE; but differs from it in the pubescent racemes, in the calyx with ciliate ridges and in the pinnate leaves.

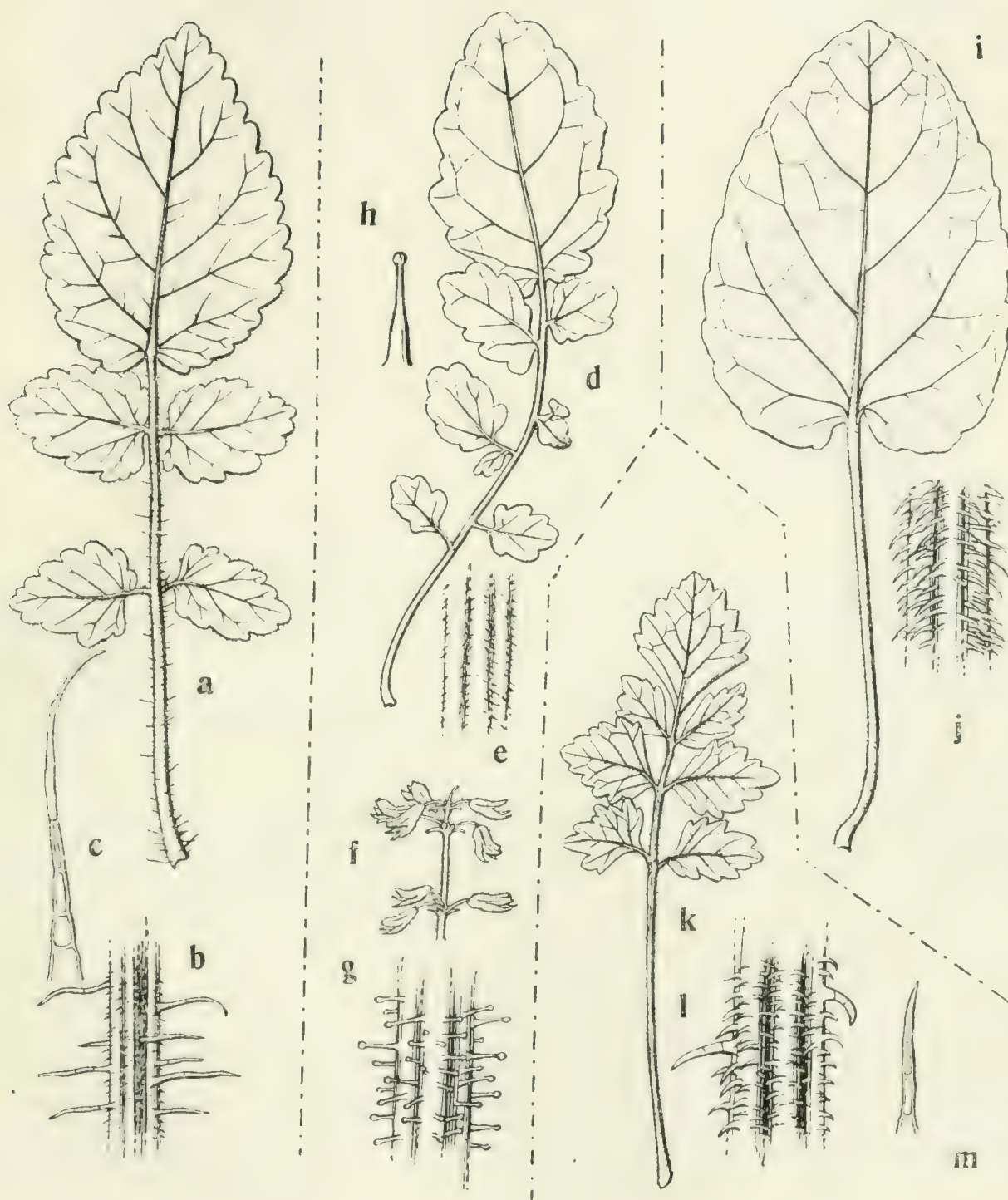


Fig. 34; a, a leaf of *Salvia keitaoensis* HAYATA; b, a portion of the petiole of the same species; c, a hair on the same; d, a leaf of *Salvia Hayatana* MAKINO; e, a portion of the petiole of the same species; f, a portion of a raceme of the same; g, a portion of the axis of the same; h, a glandular hair of the same; i, a leaf of *Salvia scapiformis* HANCE; j, a portion of the petiole of the same leaf; k, a leaf of *Salvia arisanensis* HAYATA; l, a portion of the petiole of the same leaf; m, a hair on the same.

*Melissa* LINN.

**Melissa parviflora** BENTH. var. **purpurea** HAYATA l. c. p. 57.

*Calamintha* MÖENCH.*Key to species.*

1. Bracts lanceolate .....1. *C. gracilis*.  
    Bracts setaceous .....2.
2. Verticillasters densely flowered .....2. *C. chinensis*.  
    Verticillasters loosely flowered.....3. *C. laxiflora*.
1. **Calamintha gracilis** BENTH. ; HAYATA l. c. p. 56.
2. **Calamintha chinensis** BENTH. ; HAYATA l. c. 56.
3. **Calamintha laxiflora** HAYATA l. c. 56.

*Origanum* LINN.

**Origanum vulgare** LINN. var. **formosanum** HAYATA n. v. Bracteæ oblongo-obovatae vel oblanceolatae tenuiter hirsutae 5 mm. longae  $2\frac{1}{2}$  mm. latae apice acutae vel obtusae basi anguste cuneatae. Calyx longe campanulatus 3 mm. longus  $2\frac{1}{2}$  mm. latus extus hirsutus intus glaber ad faucem dense barbatus 5-lobatus, lobis triangularibus 1 mm. longis  $\frac{1}{2}$  mm. latis. Corolla 7 mm. longa tubuloso-campanulata extus tenuiter hirsuta intus glabra 2-labiata, labro superiore late obovato-rotundato 2 mm. longo  $2\frac{1}{2}$  mm. lato apice 2-lobato, labro inferiore majore alte 3-lobato, lobo medio majore obovato-rotundato  $2\frac{1}{2}$  mm. longo 2 mm. lato, lobis lateralibus obovatis 2 mm. longis  $1\frac{1}{2}$  mm. latis; corollæ tubus intus hirsutus. Stamina 4 didynama fauce tubi affixa, anterioribus longioribus longe exsertis, posterioribus brevioribus, atheris glabris, connectivis T-formibus, loculis divaricatis. Ovarium glabrum, partibus ovoideis. Discus æqualis.

*Origanum vulgare* HAYATA Fl. Mont. Formos. p. 182 (non LINN.).

HAB. in Monte Morrison, ad 8000–12000 ped. alt. Differs from the type by the oblanceolate bracts and more hirsute calyx.

*Lycopus* LINN.

**Lycopus lucidus** TURERZ. var. **formosanus** HAYATA n. v. Caulis tetragonus ad angulos acutus vel plus minus tenuiter hirsutus ad nodos manifeste hirsutus



60–80 cm. longus paucè ramosus, ramis longissimis tenuissimis. Folia lanceolata 5 cm. longa 1 cm. lata apice acuminata basi acuta margine subintegra a medio sursum mucronibus ascendentibus remote instructa basi apiceque integra coriacea vel chartacea utraque pagine subglabra scabriuscula subtus pallidiora subtus impresso-punctata subtus ad costas hirsuta sessilia. Verticillastri densissime florati, bracteis cuspidato-ovatis 3–4 mm. longis 1 mm. latis apice cuspidatis validiuscule costatis. Flores sessiles. Calyx campanulatus  $2\frac{1}{2}$  mm. longus 2 mm. latus glaber punctis flavis conspersus 5-lobatus, lobo postico minore triangulari 1 mm. longo, lobis ceteris majoribus  $1\frac{1}{2}$  mm. longis apice acutis 1-costatis utraque glabris punctis flavis extus conspersis. Corolla subcampanulata 3 mm. longa  $2\frac{1}{2}$  mm. lata fere actinomorpha extus glabra intus ad faucem dense longeque hirsuta 2-labiata, labro superiore late rotundato 1 mm. longo  $1\frac{1}{2}$  mm. lato, labro inferiore 3-lobato, lobo medio late rotundato 1 mm. longo  $1\frac{1}{2}$  mm. lato apice rotundato, lobis lateralibus semi-rotundatis 1 mm. longis totiusque latis. Stamina 2, antheris glabris, loculis divaricatis angulo  $45^\circ$  a se egressis linearibus  $\frac{2}{3}$  mm. longis. Stylo glabro erecto 3–4 mm. longo apice 2-fido, ramo anteriore longiore  $\frac{1}{2}$  mm. longo. Ovarium glabrum 4-partitum, partibus dorso complanatis apice rotundato-complanatis. Discus sub ovario situs anteriore plus minus elevatus.

*Lycopus lucidus* HAYATA Gen. Ind. p. 57 (non TUREZ).

HAB. Sekiko, leg. G. NAKAHARA. Differs from the type by the nearly entire-subglabrous, much narrower leaves.

### *Mentha* LINN.

1. ***Mentha neptoides*** LEJ.; MATSUM. Jap. Nam. Pl. II. p. 250.

*Dysophylla glabra* HAYATA Mater. Fl. Formos. p. 226.

2. ***Mentha arvensis*** LINN. var. ***vulgaris*** BENTH.; HAYATA l. c. p. 57.

### *Perilla* LINN.

***Perilla ocymoides*** LINN. var. ***purpurascens*** HAYATA n. v.

*Perilla ocymoides* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 309 pro parte (non LINN.).

HAB. Shizangan, leg. Y. SHIMADA. Differs from the type by the ovate leaves with cuneate base and by the purpurascens flowers. According to W. B. HEMSLEY, *Perilla nankinensis* would be only a cultivated condition of *P. ocymoides*. To this we concur.

***Mosla*** BUCH.-HAM.

*Key to species.*

1. Nutlets minutely glandular dotted.....1. *M. lysimachiiflora*.  
Nutlets not dotted .....2.
2. Nutlets thinly reticulate.....2. *M. formosana*.  
Nutlets strongly reticulate .....3. *M. leucantha*.

1. ***Mosla leucantha*** HAYATA sp. nov. (Fig. 35-2). Herba basi suffruticosa annua; caulis tetragonus toto tenuiter hirsutus, ramis oppositis ascendentibus racemo terminatis. Folia chartaceo-membranacea ovato-oblonga vel oblonga 15 mm. longa 7-8 mm. lata apice acuta basi acuta vel late cuneata margine serrata utraque pagina glabra subtus impresso-punctata, petiolis 5 mm. longis. Racemi terminales 5-7 cm. longi, floribus oppositis, bracteis ovato-lanceolatis hirsutis, pedicellis 3 mm. longis hirsutis. Calyx extus densissime hirsutus subcampanulatus  $1\frac{1}{2}$  mm. longus 2-labiatus intus subglaber. Corolla alba 2 mm. longa  $1\frac{1}{2}$  mm. lata extus hirsuta intus glabra 2-labiata, labro superiore brevissimo ad centrum emarginato, labro inferiore 3-lobato, lobis lateralibus minutis rotundatis  $\frac{1}{4}$  mm. longis, lobo medio late rotundato  $\frac{2}{3}$  longo et lato margine crenulato vel subintegro. Stamina didynama, anterioribus brevioribus sterilibus, posterioribus longioribus fertilibus, ad faucem corollae affixa, connectivis T-formibus minutis, loculis ad extremitates connectivorum affixis divaricatis a se angulo  $45^\circ$  egressis. Stylus glaber apice 2-fidus, ramo anteriore longiore. Ovarium glabrum, partibus obovoideis. Discus annularis, glanda columniformi  $\frac{1}{3}$  mm. longa anteriore insita. Nucula distincte elevato-reticulata.

HAB. Kwannonzan; Biōritsu: Taiko. Near *Mosla punctata* MAXIM.; but differs from it in the much smaller fruits.

2. ***Mosla formosana*** MAXIM. (Fig. 35-1); HAYATA l. c. p. 57.

3. ***Mosla lysimachiiflora*** HAYATA sp. nov. (Fig. 35-3). Herba basi suffruticosa 60-70 cm. longa; caulis tetragonus subglaber. Folia chartaceo-

membranacea ovata 3 cm. longa 2 cm. lata apice triangulari-obtusa basi late cuneata basi integra a basi sursum dentato-serrata, serris triangularibus ascendentibus, utraque glabra subtus impresso-punctata, petiolis 1-2 cm. longis. Racemi terminales 5-6 cm. longi. Flores oppositi basi bracteis lanceolatis 5-2 mm. longis instructi, pedicellis 2-3 mm. longis brevissime hirsutis. Calyx campanulatus 2 mm. longus 3 mm. latus extus subglaber punctatus intus sparse longe hirsutus 2 labiatus, labro superiore 3-lobato, lobo medio minuto semi-rotundato  $\frac{1}{2}$  mm. lato et longo, lobis lateralibus majoribus  $1\frac{1}{2}$  mm. longis 1 mm. latis apice acutis medio 1-carinatis, labro inferiore alte 2-lobato, lobis oblongo-triangularibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice acutis 1-costatis. Corolla oblique campanulata 5-6 mm. longa 5 mm. lata tenuiter 2-labiata extus intusque

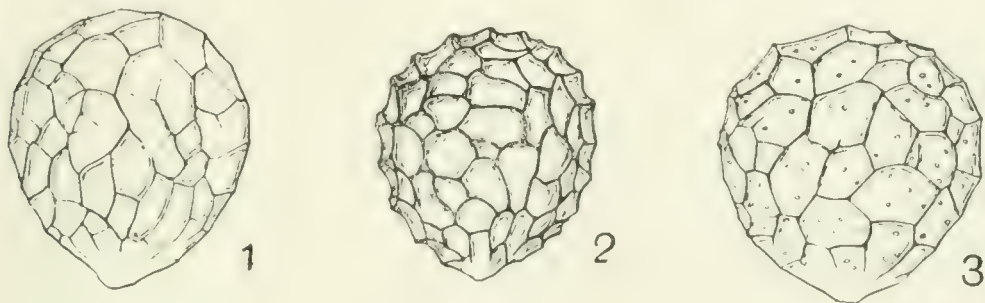


Fig. 35; 1, *Mosla formosana* MAXIM.; 2, *Mosla leucantha* HAYATA;  
3, *Mosla lysimachiiiflora* HAYATA.

tenuissime hirsuta vel subglabra, labro superiore 1 mm. longo 2 mm. lato brevissime 2 lobato vel emarginato, labro inferiore majore 3-lobato, lobis lateralibus late semi-rotundatis 1 mm. longis  $1\frac{1}{2}$  mm. latis apice rotundatis, lobo medio maximo late rotundato 3 mm. lato 2 mm. longo apice rotundato basi contracto margine denticulato supra tenuiter hirsuto. Stamina 4 didynama, anterioribus sterilibus brevioribus, posterioribus longioribus fertilibus exsertis, filamentis glabris, connectivis dilatatis vel brachiiiformibus, loculis antherarum ad extremitates connectivi sitis. Stylus glaber 6 mm. longus apice 2-fidus, ramo anteriore longiore  $\frac{1}{2}$  mm. longo. Ovarium glabrum, partibus rotundatis, glandula anteriore  $\frac{1}{3}$  mm. longa. Nucula tenuiter reticulata punctata.

HAB. Tamsui, Taihoku.

Near *Mosla formosana* MAXIM.; but distinguishable from it in the larger bracts and flowers.



*Elsholtzia* WILLD.*Key to species.*

Bracts ciliate, flowers bifariously spicate.....*E. formosana*.

Bracts not ciliate, flowers quadrifariously spicate .....*E. Oldhami*.

1. **Elsholtzia formosana** HAYATA sp. nov. = *E. cristata* HAYATA l. c. p. 56, (non WILLD.). Herba annua? caulis 30–40 cm. longus tetragonus tenuiter hirsutus stramineus. Folia opposita ovata ovato-lanceolata 4–5 cm. longa  $1\frac{1}{2}$ –2 cm. lata apice acuta vel acuminata basi subito cuneata membranacea basi integra sursum basi dentata supra minute hirsuta subtus subglabra distincte impresso-punctata, petiolis 1 cm. longis. Spicæ verticillastri 3–4 cm. longæ 1 cm. latæ ad apicem ramulorum terminales, bracteis mediis extus hirsutis intus glabris reniformi-rotundatis 6–7 mm. latis 4–5 mm. longis apice aristato-cuspidatis, cuspidibus  $1\frac{1}{2}$  mm. longis margine dense ciliatis utraque pagine minute glanduloso-punctatis, verticillastri 5–6-floratis, pedicellis glabris 1 mm. longis. Calyx late tubulosus 2 mm. longus 1 mm. latus dense hirsutus intus glaber apice 5-lobatus, lobis subæqualibus lineari-triangularibus apice acuminatis aristis instructis  $1\frac{1}{2}$  mm. longis extus dense hirsutis intus glabris. Corolla tubulosa versus apicem gradatim dilatata extus dense hirsuta, labro superiore 1 mm. longo totiusque lato apice medio late emarginato vel 2-lobato, lobis rotundatis, labro inferiore 3-lobato, lobis lateralibus minoribus rotundato-oblongis  $\frac{1}{2}$  mm. longis, lobo medio rotundato 1 mm. longo totiusque lato concavo. Stamina didynama, anteriora longiora longe exserta, posteriora breviora, filamentis glabris, antheris glabris, loculis divaricatis fere confluentibus. Discus annularis 4-dentatus, dentibus triangularibus, uno antico longiore columniformi  $\frac{1}{2}$  mm. longo. Ovarium glabrum 4-partitum, partibus obovoideis  $\frac{1}{2}$  mm. longis, stylo glabro 5 mm. longo apice 2-fido, ramis subæqualibus.

HAB. Rokujō-daizan.

Differs from *E. cristata* by the densely ciliate bracts and densely barbate calyx.

2. **Elsholtzia Oldhami** HEMSL.; HAYATA l. c. p. 56.

*Pogostemon* DESF.

**Pogostemon formosanus** OLIVER; HAYATA Gen. Ind. p. 57.

***Dysophylla* BLUME.***Key to species.*

- Leaves opposite lanceolate larger.....1. *D. auricularia*  
 Leaves verticillate linear smaller .....2. *D. verticillata*.  
 1. ***Dysophylla auricularia*** BLUME; HAYATA l. c. p. 56.  
 2. ***Dysophylla verticillata*** BENTH.; HAYATA l. c. p. 56.

***Hyptis* JACQ.***Key to species.*

1. Verticillasters densely spicate or capitate .....2.  
 Verticillasters loosely racemose .....1. *H. suaveolens*.  
 2. Verticillasters densely spicate .....2. *H. spicigera*.  
 Verticillasters capitate .....3.  
 3. Peduncles of heads shorter, at most 1 cm. long.....3. *H. brevipes*.  
 Peduncles of heads longer, 5 cm. long.....4. *H. capitata*.  
 1. ***Hyptis suaveolens*** POIT.; HAYATA l. c. p. 57.  
 2. ***Hyptis spicigera*** LAM.; HAYATA l. c. p. 57.  
 3. ***Hyptis brevipes*** POIT.; HAYATA l. c. p. 57.  
 4. ***Hyptis capitata*** JACQ.; HAYATA l. c. p. 57.

***Plectranthus* L'HÉRIT.***Key to species.*

- Leaves hirsute on both sides .....1. *P. daitonensis*.  
 Leaves nearly glabrous on the upper side.....2. *P. lasiocarpa*.

1. ***Plectranthus daitonensis*** HAYATA sp. nov. (Fig. 36-1). Herba basi suffruticosa 60-100 cm. longa; caulis tetragonus tenuiter hirsutus paullo ramosus, ramis gracillimis. Folia obovata vel rhomboideo-ovata apice triangulari-acuta basi cuneato-attenuata margine a medio sursum dentato-serrata supra tenuiter hirsuta subtus tenuissime hirsuta pallidiora subtus minutissime glanduloso-punctata, petiolis 2-3 mm. longis. Cymæ axillares vel terminales paniculam formantes, pedunculis 2-3 cm. longis apice 5-10-floratis, pedicellis 1-2 mm.

longis minute hirsutis. Calyx oblique campanulatus 3 mm. longus totiusque latus hirsutus intus glaber 10-costatus apice oblique 5-lobatus, lobis triangularibus apice acutis plus minus inæqualibus. Corollæ tubus 3 mm. longus exsertus basi postice gibbosus extus hirsutus intus glaber basi hirsutus declinatus medio suberectus; limbus 2-labiatus, labro postico breviter 4-fido, labro, antico integro longiore concavo. Stamina 4 didynama declinata, filamentis edentulis liberis basi hirsutis, antheræ loculis divaricatis subdistinctis. Discus antice in glandulam ovario breviorum tumens. Stylus apice breviter 2-fidus, lobis subæqualibus acutis.

HAB. Daitonzan; leg. T. KAWAKAMI, Juli. 1909.

2. **Plectranthus lasiocarpus** HAYATA (Fig. 36) Mater. Fl. Formos. (1911) p. 224 Gen. Ind. p. 57. *Plectranthus serra* HAYATA Gen. Ind. p. 57 (non MAXIM.); *Plectranthus formosanus* HAYATA et NAKAI in Sched. Herb. Univ. Tōkyō. Herba circ. 60 cm. longa paucè ramosa; caulis erectus rectus pilis retrorsis brevissimis dense obtectus tetragonus facie sulcatus. Folia membranacea ovata 8 cm. longa 4 cm. lata apice acuta basi subito cuneata ad alam petiolorum abeuntia margine serrata, serris ascendentibus acutis plus minus superiore recurvis, utraque pagine subglabra vel tenuiter hirsuta, petiolis 1–2 cm. longis interdum nullis. Cymæ axillares vel terminales simplices vel paniculatim dispositæ, bracteis variabilis ovatis vel lanceolatis, pedicellis hirsutis.

Calyx oblique campanulatus extus hirsutus intus glaber 10-costatus, lobo postico minuto lineari-triangulari 1 mm. longo  $\frac{1}{4}$  mm. lato apice acuminato, lobis anterioribus  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis. Corolla extus hirsuta, tubo 3 mm. longo  $2\frac{1}{2}$  mm. lato basi contracto intus hirsuto, limbo bilabiato, labro posteriore reflexo 4-lobato 3–4 mm. longo, lobis semi-rotundatis, labro anteriore recto naviculiformi 4 mm. longo apice subacuto. Stamina didynama, 2-anterioribus longioribus, filamentis basi hirsutis, antheris glabris, loculis confluentibus. Stylus glaber superiore recurvus, ramis æqualibus. Ovarium apice dense hirsutum.

HAB. Taihoku, Tōyen.

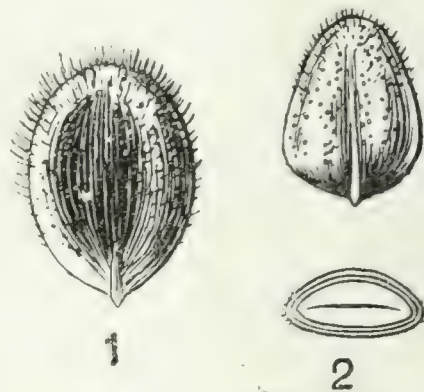


Fig. 36; *Plectranthus lasiocarpa* HAYATA; 1, 2, different forms of the fruits.



***Coleus* LOUR.***Key to species.*

1. Leaves perfectly glabrous.....1. *C. Blumei*.  
   Leaves more or less hairy.....2.
2. Pedicels 3-times longer than the flowers .....2. *C. mucosus*.  
   Pedicels nearly equal the length of the flowers.....3. *C. formosanus*.
1. ***Coleus Blumei*** BENTH.; HAYATA l. c. p. 56.
2. ***Coleus mucosus*** HAYATA l. c. p. 56.
3. ***Coleus formosanus*** HAYATA l. c. p. 56.

***Mesona* BLUME.**

***Mesona procumbens*** HEMSL.; HAYATA l. c. p. 57.

***Mesona elegans*** HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 305, t. 16.

This is perhaps a dwarf form of *Mesona procumbens* MAXIM.; for in farther examination, I can not detect any difference in the floral structures.

***Acrocephalus* BENTH.**

***Acrocephalus capitatus*** BENTH.; HAYATA l. c. p. 56.

***Ocimum* LINN.***Key to species.*

1. Flowers minute, at most 2 mm. in length. Verticillasters densely spicate  
   .....1. *O. Tashiroi*.  
   Flowers larger, more than 3 mm. in length .....2.
2. Leaves glabrous, flowers larger .....2. *O. Basilicum*.  
   Leaves densely hirsute, flowers smaller.....3. *O. sanctum*.
1. ***Ocimum Tashiroi*** (MATSUM.) HAYATA n.n. *Mosla Tashiroi* MATSUM.  
 in Sched. Herb. Tōkyō.

HAB. Holisha, leg. Y. TASHIRO, Mart. 1896.

As the plant has 4 perfect stamens which are descending and lying on the lower lip of the corolla, it should be transferred to *Ocimum* from *Molsa* to which it was referred by Prof. J. MATSUMURA. The description will be given in the next volume.

2. ***Ocimum Basilicum*** LINN.; HAYATA l. c. p. 57.

3. ***Ocimum sanctum*** LINN.; HAYATA l. c. p. 57.

## Aristolochiaceæ.

### *Aristolochia* LINN.

***Aristolochia Shimadai*** HAYATA (Pl. XIII.) Ic. Pl. Formos. VI. p. 36.

Descriptio aucta:—Capsula pendula globoso-ovoidea 3 cm. longa  $2\frac{1}{2}$  cm. lata hexagona 6-costata loculicide dehiscens. Semina complanata triangulari-ovata 5 mm. longa 3 mm. lata apice obtusa basi rotundata dorso concava ventrali excavata sed medio prominente costata; testa membranacea.

HAB. Shintiku, Shinpo, leg. Y. SHIMADA.

***Chelonopsis moschata*** Miq. var. ***lasiocalyx*** HAYATA n. v. Herba basi fruticosa annua; caulis erectus simplex tetragonus 30-40 cm. longus rectus a medio sursum foliatus leviter hirsutus fusco-purpureus. Folia opposita oblonga vel oblongo-lanceolata 10 cm. longa 4 cm. lata apice acuminata vel acuminatissima basi-acuta obtusa vel obtusissima chartaceo-membranacea margine dentata, dentibus triangularibus ascendentibus, supra minute hirsuta subtus pallidiora ad costas venasque pilosa, petiolis 5 mm. longis hirsutis. Flores ad axillas foliorum superiorum solitarii, pedicellis 5 mm. longis hirsutis, bracteis versus apicem pedicellorum 1-2 instructis lanceolatis 7 mm. longis 2 mm. latis hirsutis. Flores horizontaliter dispositi. Calyx subcampanulatus  $1\frac{1}{2}$  cm. longus 1 cm. latus hirsutus apice 5-lobatus, lobis subæqualibus triangulari-oblongis 5 mm. longis 3 mm. latis apice obtuso-acutis basi haud contractis margine integris intus glabris. Corolla albo-purpurascens tubiformis  $3\frac{1}{2}$  cm. longa 13 mm. lata basi plus minus contracta 4 mm. lata ad faucem 13 mm. lata extus versus apicem hirsuta cæterum glabra intus basi hirsuta cæterum glabra, labro superiore brevissimo late rotundato-triangulari 5 mm. longo 8 mm. lato apice obtuso-truncato basi plus minus contracto utraque pagine tenuissime hirsuto apice haud emarginato, labro inferiore majore 3-lobato, lobo medio semirotundato 8 mm. longo apice rotundato 12 mm. lato margine denticulato-crenulato basi contracto horizontaliter patenti, lobis lateralibus brevioribus semi-rotundatis 4 mm. longis totiusque latis. Stamina 4 subæqualia basi corollæ affixa, filamentis rectis  $2\frac{1}{2}$  cm. longis plus minus hirsutis, antheris per paria approximatis, connectivis latissimis, loculis divaricatis ad apicem connectivi sitis utraque extremitate et medio fasciculis pilorum instructis, pilis albis 1 mm. longis. Stylo glabro  $2\frac{1}{2}$  cm. longo apice 2-fido, ramis inæqualibus, ramo superiore minus quam 1 mm., inferiore plus quam 1 mm. longo. Discus annularis  $\frac{1}{2}$  mm. altus glanda una 2 mm. longa incrassata anteriore instructus. Ovarium glabrum 4-partitum, partibus rotundatis 1 mm. longis totiusque latis.

HAB. Ashitaka, Juli. 1917.

Differs from the type by the hirsute leaves and calyx and by the much broader bracts.

## Loranthaceæ.

*Loranthus* LINN.

**Loranthus Kæmpferi** MAXIM. Mém. Biol. IX. p. 612; FRANCH. et SAV. Enum. Pl. Jap. II. p. 482; MATSUM. Ind. Pl. Jap. II.—2, p. 48.

HAB. Nantō: inter Ushōkō et Keitao, leg. R. KANEHIRA et S. SASAKI, No. 92.

Resembles very much the named species. As the specimen lacks flowers, the determination is rather conjectural.

## Urticaceæ.

*Ficus* LINN.

In working up the genus, I found it extremely difficult to follow the system given by GEORGE KING in his elaborate work, "The Species of *Ficus* of the Indo-Malayan and Chinese Countries," in Annals of the Royal Botanic Garden, Calcutta, Vol. I. (1887–1888); for the herbarium-materials can never be sufficient enough to consider the characters of all the kinds of flowers. To meet the practical purpose, I did not follow any system, but classified the species, according to their leaves, habits and shapes of the receptacles, without going into details as to the characters of flowers.

*Key to species.*

1. Scandent or creeping shrubs.....2.
- Erect shrubs or trees .....8.
2. Adult leaves less than  $1\frac{1}{2}$  cm. long; prostrate; receptacles nearly globose, less than 1 cm. in diameter.....1. *F. vaccinioides*.
- Adult leaves more than 2 cm. long, (if smaller, neither creeping nor prostrate) .....3.
3. Receptacles smaller than  $1\frac{1}{2}$  cm. in diameter.....4.
- Receptacles more than 3 cm. in diameter .....6.
4. Stem very slender, scandent but not prostrate; leaves linear obovate entire



- or lobate, chartaceous, but not coriaceous .....2. *F. tannensis*.  
 Stem not very slender, climbing; leaves entire oblong-lanceolate or lanceo-  
 late, coriaceous.....5.
5. Receptacles  $1\frac{1}{2}$ –2 cm. in diameter, more or less rostrate at the apex usually  
 hirsute (hairs brown); stamen linear apiculate .....3. *F. arisanensis*.  
 Receptacles nearly the same size as, or a little smaller than the preceding,  
 not or slightly apiculate at the apex, nearly glabrous...4. *F. foveolata*.
6. Leaves minutely pitted on the under surface, pits filled with hairs .....  
 .....5. *F. terasensis*.  
 Leaves not pitted on the under surface, hirsute .....7.
7. Receptacles ellipsoid .....6. *F. Awkeotsang*.  
 Receptacles urceolate.....7. *F. pumila*.
8. Receptacles mostly axillary .....9.  
 Receptacles mostly in fascicles on trunks or branches .....24.
9. Leaves glabrous, quite smooth.....10.  
 Leaves hirsute or scabrous, but not smooth.....18.
10. Leaves membranaceous or chartaceous; small shrub; leaves variable .....  
 .....8. *F. formosana*.  
 Leaves coriaceous .....11.
11. Leaves obovate rounded at the apex, cuneate at the base; small shrub on  
 sea-shore .....9. *F. garanbiensis*.  
 Leaves never rounded at the apex.....12.
12. Lateral nerves (or basal veins) parallel with primary lateral veins .....13.  
 Lateral nerves (or basal veins) not parallel with primary lateral veins...14.
13. Leaves shortly tailed at the apex; tails at most 5 mm. long, very obtuse  
 at the apex.....10. *F. retusa*.  
 Leaves abruptly long-tailed at the apex; tails 1 cm. long, slightly obtuse  
 at the apex.....11. *F. cuspidato-caudata*.
14. Leaves tri-nerved at the base .....12. *F. Wightiana*.  
 Leaves pinni-nerved.....15.
15. Leaves with middle lateral veins diverging from the costa at  $70^{\circ}$ – $80^{\circ}$ ,  
 cuspidate at the apex .....13. *F. vasculosa*.  
 Leaves with middle lateral veins diverging from the costa at  $60^{\circ}$ – $40^{\circ}$ ...16.

16. Leaves obovate triangularly obtuse at the apex.....14. *F. leucantatoma*.  
 Leaves oblong lanceolate or obovato-oblong more or less caudate at the  
 apex .....17.
17. Leaves minutely dotted on the under surface.....15. *F. Harlandi*.  
 Leaves not at all dotted on the under surface .....16. *F. nervosa*.
18. Leaves hirsute .....19.  
 Leaves scabrous but not hirsute.....20.
19. Leaves linear .....17. *F. koshunensis*.  
 Leaves oblong or obovately oblong.....  
 .....18. *F. Beecheyana*. = *F. maruyamensis*.
20. Leaves obovate or elliptical, very obtuse or triangularly acute, neither  
 caudate nor acuminate.....19. *F. Swinhœi*.  
 Leaves acuminate or caudate .....21.
21. Leaves cuneate at the base.....22.  
 Leaves rounded at the base.....23.
22. Leaves small oblongo-lanceolate nearly 6 cm. long.....20. *F. Kingiana*.  
 Leaves oblong usually 10 cm. long .....21. *F. gibbosa*.
23. Leaves equal at the base .....22. *F. Kusanoi*.  
 Leaves unequal at the base .....23. *F. Somai*.
24. Leaves slightly cordate at the base .....25.  
 Leaves not cordate at the base .....26.
25. Leaves oblong, not rounded .....24. *F. antacensis*.  
 Leaves nearly rounded .....25. *F. hieranensis*.
26. Leaves nearly trinerved .....27.  
 Leaves never trinerved.....28.
27. Ovary stipitate above the perianth.....26. *F. Konishii*.  
 Ovary not stipitate above the perianth.....27. *F. glochidiifolia*.
28. Leaves oblique at the base .....28. *F. kotœnsis*.  
 Leaves cuneate or obtuse at the base .....29.
29. Leaves cuneate at the base.....29. *F. kaukauensis*.  
 Leaves obtuse at the base.....29. *F. ochobiensis*.

1. **Ficus vaccinioides** HEMSL.; HAYATA. l. c. p. 69.

2. **Ficus tannœnsis** HAYATA (Pl. XIV. et Fig. 37) Ic. Pl. Formos. VII. p. 36.

Forma **angustifolia**. Folia linearia.

HAB. Tannō, Suō.

Forma **rhombifolia**. Folia obovato-oblonga vel obovata 3-lobata, lobo medio triangulari-cuspidato.

HAB. Taroko, Kaukaukei.

3. **Ficus arisanensis** HAYATA sp. nov. (Fig. 38, 40—1, 2) Frutex ad truncos arborum crescens et scandens, ramis rugosis minute lenticellatis. Folia alterna lanceolata ovato-lanceolata 14 cm. longa  $3\frac{1}{2}$  cm. lata apice acuminata vel acuminatissima basi obtusa vel acuta margine subintegra supra glabra subtus subglabra, costis venisque supra haud vel vix elevatis sed subtus prominente elevatis, venis primariis lateralibus utroque latere costæ 8–9, mediis a costa angulo  $45^\circ$  egressis, subtus sub lente minute foveolata coriacea, costa subtus sparse barbis longis adpressis conspersa, subtus fulvo-

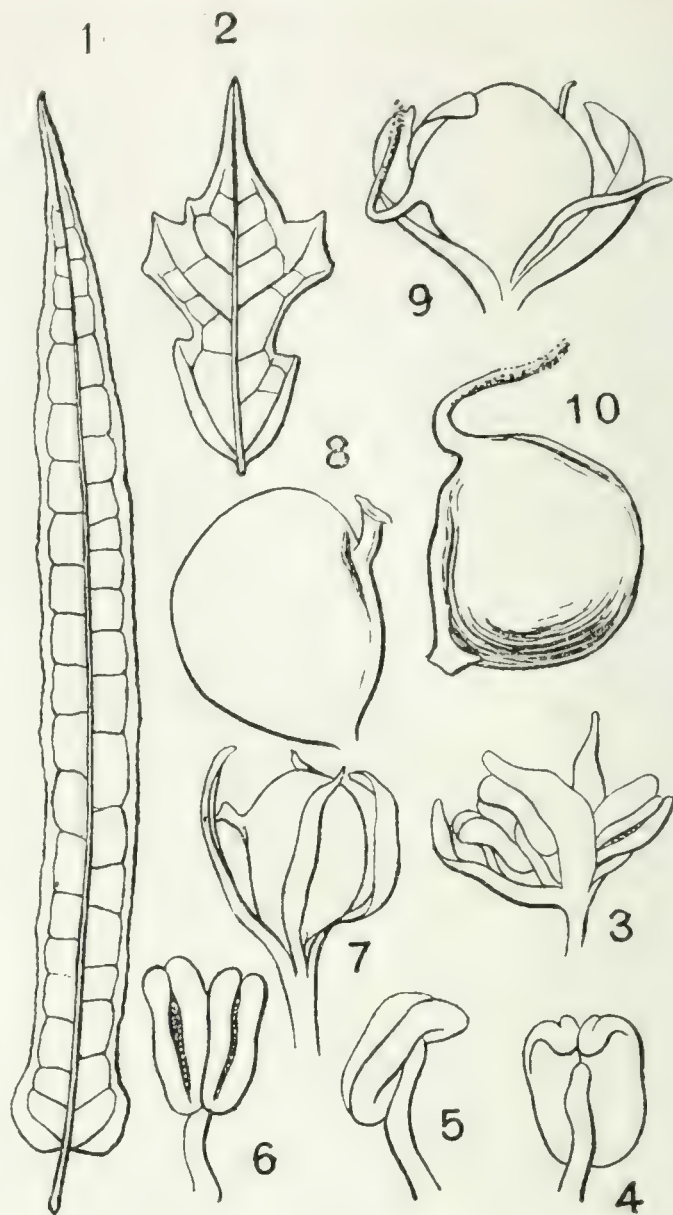


Fig. 37; *Ficus tannœnsis* HAYATA; 1, a leaf of *F. tannœnsis* form. *angustifolia*; 2, a leaf of *F. tannœnsis* form. *rhombifolia*; 3, a male flower; 4, 5, 6, stamens, seen from different sides; 7, a gall flower; 8, gall ovary; 9, a female flower; 10, a fruit.

eneracea, petiolis  $1\frac{1}{2}$ –2 cm. longis dense fulvo-hirsutis. Receptacula ad axillas foliorum gemina vel solitaria sessilia subglobosa 17 mm. longa 14 mm. lata apice bracteis circum oria rostrata, rostris 2–3 mm. longis, dense vel sparse fulvo-hirsuta; bracteis 3 ad basin receptaculi dispositis triangulari-ovatis 5 mm.



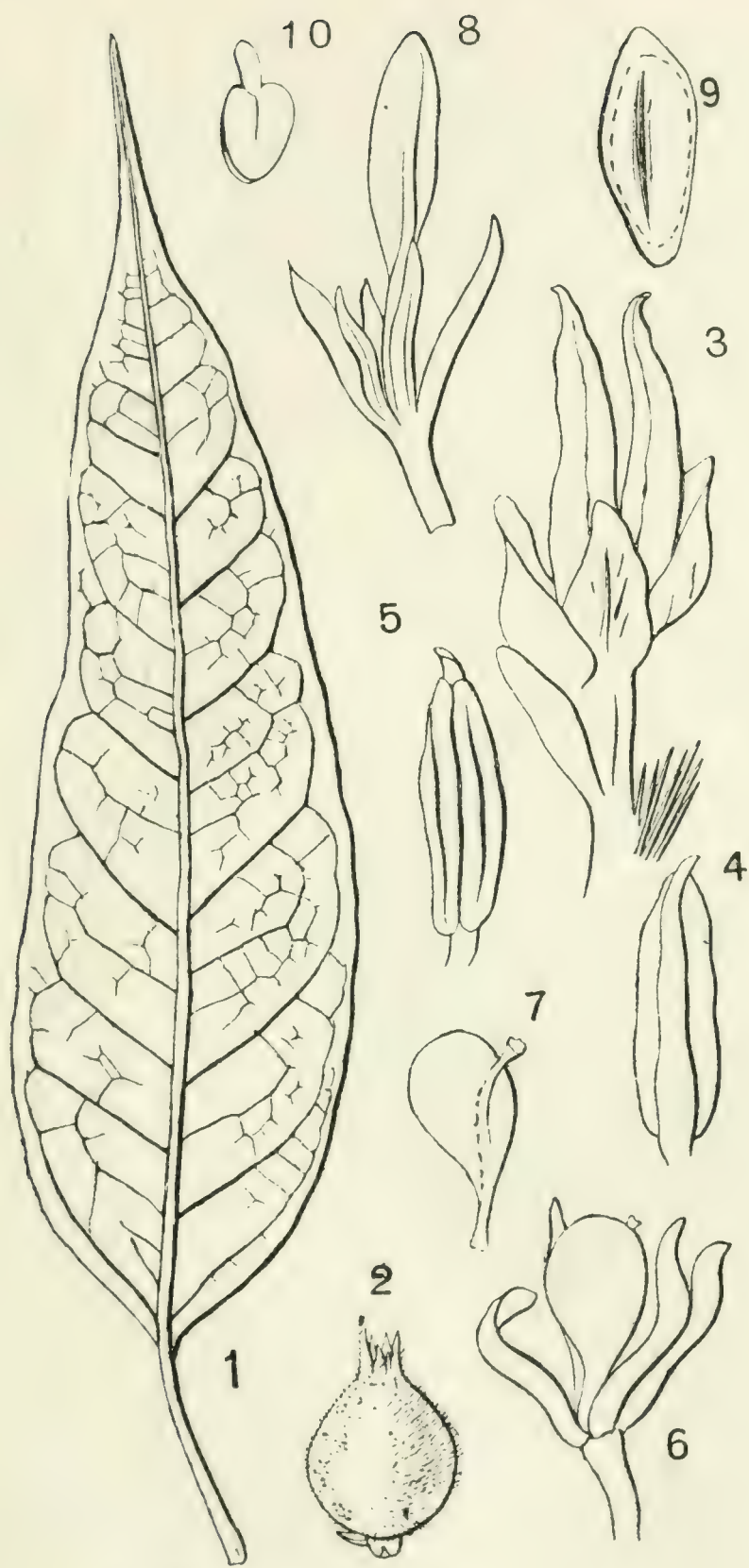


Fig. 38; *Ficus arisanensis* HAYATA; 1, a leaf; 2, a receptacle; 3, a male flower; 4, 5, stamens, seen from different sides; 6, a gall-flower; 7, a gall-ovary; 8, a female flower; 9, a fruit; 10, an embryo.

longis 3 mm. latis dorso hirsutis apice acutis, bracteis circum oria 3-seriatim dispositis triangularibus 2–3 mm. longis dense fulvo-hirsutis. Fl. ♂ stipitati, stipitibus 3 mm. longis sparse hirsutis basi bracteis 1 instructis, perianthii segmenta 3–4 oblonga 2 mm. longa obtusa; stamina 2, filamentis validiusculis 1 mm. longis, antheris ellipticis 2 mm. longis 1 mm. latis apice apiculatis. Fl. gall. stipitati, stipitibus 2 mm. longis, perianthii segmenta 4, segmentis linearibus  $2\frac{1}{2}$  mm. longis apice obtusis; ovarium galliferum supra perianthium stipitatum, stipite 1 mm. longo, oblique obovatum  $1\frac{1}{2}$  mm. longum basi attenuatum; receptaculum intus dense setulo-sohirsutum. Fl. ♀ ovarium obovoideum  $1\frac{1}{2}$  mm. longum, stigmate 1 mm. longo filiformi.

HAB. Arisan, Keitao.

Near *F. foveolata*, but differs from it by the densely hirsute receptacles. The leaves of the new species

are minutely pitted on the under surface; while those of *F. foveolata* have only impressed intravenal areas, but are not pitted.

4. ***Ficus foveolata*** WALL.; HAYATA l. c. p. 69:

5. ***Ficus terasœnsis*** HAYATA sp. nov. (Fig. 39, 40—3, 4) Ad truncos arborum scandens, ramis rugosis lenticellatis. Folia chartacea vel coriacea oblongo-rotundata  $5\frac{1}{2}$  cm. longa 4 cm. lata apice rotundata vix emarginata basi obtusissima margine integra, costa cum venis supra haud elevata subtus prominente elevata, venis lateralibus primariis utroque latere costæ 4–5 sursum arcuatis, subtus pallidiora minute foveolata, foveolis dense hirsutis, petiolis 1 cm. longis. Receptacula ad axillas foliorum solitaria ellipsoidea 7 cm. longa 5 cm. lata apice rotundato-obtusa vel cum bracteis circum oria recep-

taculi obtusis apiculata basi ad stipitem 5 mm. longum attenuata glabra, bracteis ad basin receptaculi 3–4 dispositis triangularibus 2–3 mm. longis, pedunculis 1 cm. longis. Receptaculum galliferum cum fl. gall. et fl. ♂. Fl. ♂ longe

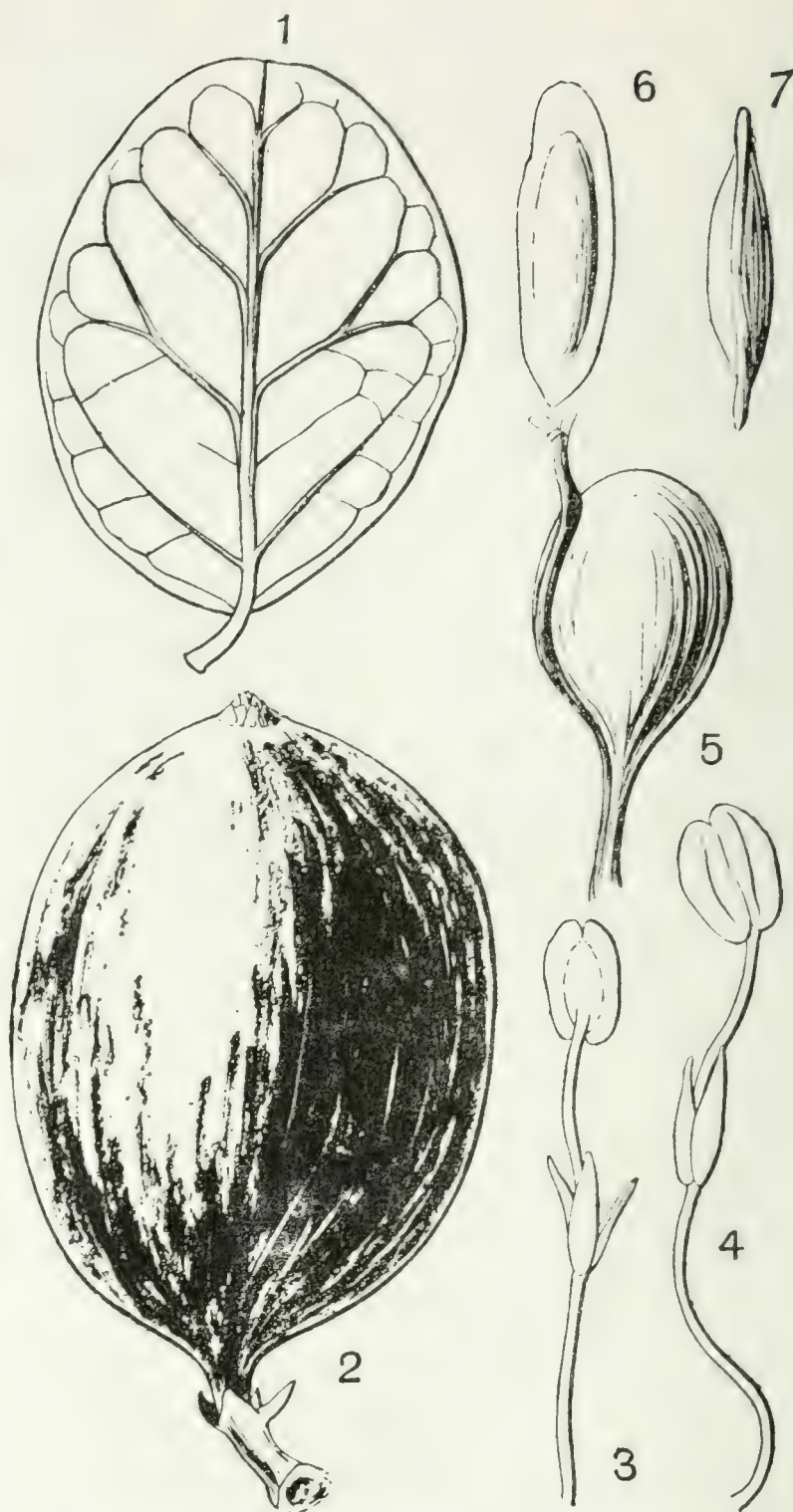


Fig. 39, *Ficus terasœnsis* HAYATA; 1, a leaf; 2, a receptacle; 3, 4, male flowers; 5, a gall flower; 6, 7, fruits, seen from different sides.



pedicellati, pedicellis 4 mm. longis; perianthii segmenta 3 basi plus minus

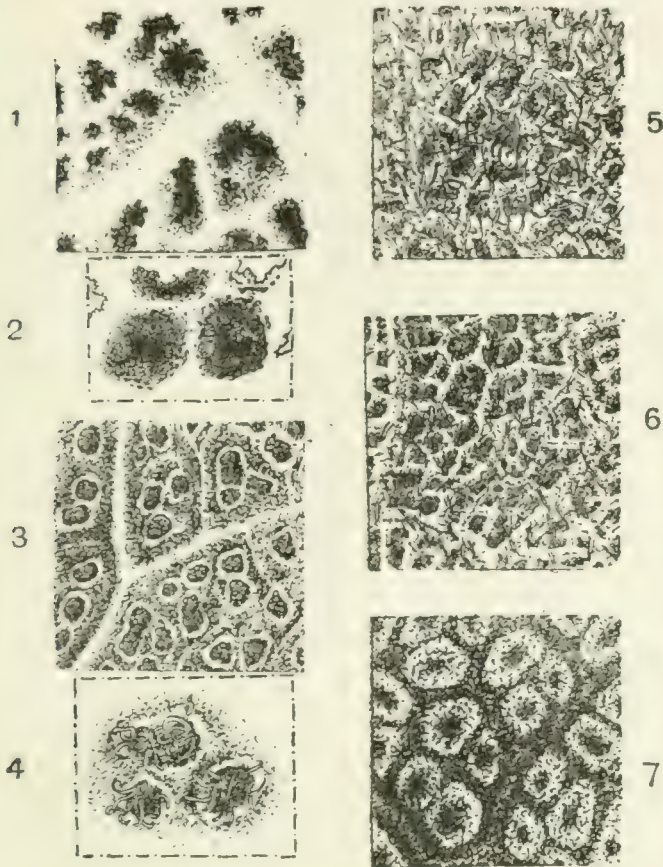


Fig. 40; 1, the portion of the under surface of a leaf of *F. arisanensis*; 2, the same, more enlarged; 3, a portion of that of *F. terasoensis*; 4, the same, more enlarged; 5, that of *F. pumila*; 6, that of *F. Awkeotsang*; 7, that of *F. foreolata*; 1, 3, 5, 6 and 7, are magnified in the same proportion.

connata lanceolata 1 mm. longa; stamen 1, filamentis 2-3 mm. longis, antheris ellipticis complanatis  $1\frac{1}{2}$  mm. longis 1 mm. latis. Fl. gall.: perianthium ignotum; ovarium gall. oblique obovoideum 2 mm. longum  $1\frac{1}{2}$  mm. latum apice rotundatum basi subito ad stipitem attenuatum, stipitibus 2- $2\frac{1}{2}$  mm. longis. Fructus obovoideofusiformis  $2\frac{1}{2}$  mm. longus 1 mm. latus apice obtusissimus basi acutus.

HAB. Teraso, Hieranzan, Juni. 1912, leg. B. HAYATA et S. SASAKI.

Near *F. Awkeotsang* MAKINO; but differs from it by the nearly rounded leaves. Also near *Ficus callicarpa* MIQ. (KING Sp. Fic. Indo-Malay. p. 69, tt. 90, 101, B.), but differs from it by the elliptical receptacles and in the

male flowers with emarginate anthers.

6. **Ficus Awkeotsang** MAKINO (Fig. 40-6); HAYATA l. c. p. 69.

7. **Ficus pumila** LINN. (Fig. 40-7); HAYATA l. c. p. 69.

8<sub>a</sub>. **Ficus formosana** MAXIM.; HAYATA l. c. p. 69.

*F. pyriformis* HEMSL. Ind. Fl. Sin. II. p. 466, pro parte (non Hook. et ARN.); MATSUM. et HAYATA Enum. Pl. Formos. p. 378.

*Ficus taiwaniana* HAYATA Gen. Ind. p. 69.

Female receptacles of this species are usually shorter and more rounded than the gall-receptacles. The latter are usually more or less elongated and pyriform.



8. **Ficus formosana** MAXIM. forma **Shimadai** (Fig. 41).

HAB. Sankakuyū, leg. Y. SHIMADA.

9. **Ficus garanbiensis** HAYATA sp. nov. (Fig. 42) Frutex ad litus crescens 1–2 ped. alt. basi repens sursum ascendens. Folia coriacea obovata 5–9 cm. longa  $2\frac{1}{2}$ –5 cm. lata apice rotundata basi cuneata ad extremitatem obtusa margine integra basi 3-nervia utraque pagine glaberrima, venis lateralibus primariis utroque latere costae 5–6 rectis prope marginem subito arcuatis, venis supra haud subtus vix elevatis, petiolis 1–2 cm. longis. Receptacula tenuiter hirsuta ad axillas foliorum solitaria, pedicellis 2 cm. longis glabris erectis, pyriformia  $1\frac{1}{2}$  cm. longa 1 cm. lata apice acuto-obtusa basi subito attenuata ad stipitem 3–4 mm. longum abeuntia, bracteis basi receptaculi 3 dispositis late triangularibus 2 mm. latis 1 mm. longis hirsuto-villosis, pedunculis 3 cm. longis hirsutis. Fl. ♂: pedicellis 2 mm. longis, basi bracteis singulis instructis. Perianthii segmenta 2–4 oblonga 1 mm. longa obtusa acuta. Stamina 2–4, filamentis  $\frac{1}{3}$  mm. longis glabris, antheris late oblongis 1 mm. longis utraque emarginatis. Fl. gall. sessiles, perianthii segmenta 3–5 linearia  $1\frac{1}{2}$ –2 mm. longa  $\frac{1}{4}$  mm. lata acuminata. Ovarium galliferum oblique globosum 1 mm. in diametro basi supra perianthium stipite  $\frac{1}{2}$  mm. longo instructum.

HAB. ad litus Kankao, leg B. HAYATA Juni. 1912 (typus); Garanbi et Kwashōtō, leg. T. SōMA.

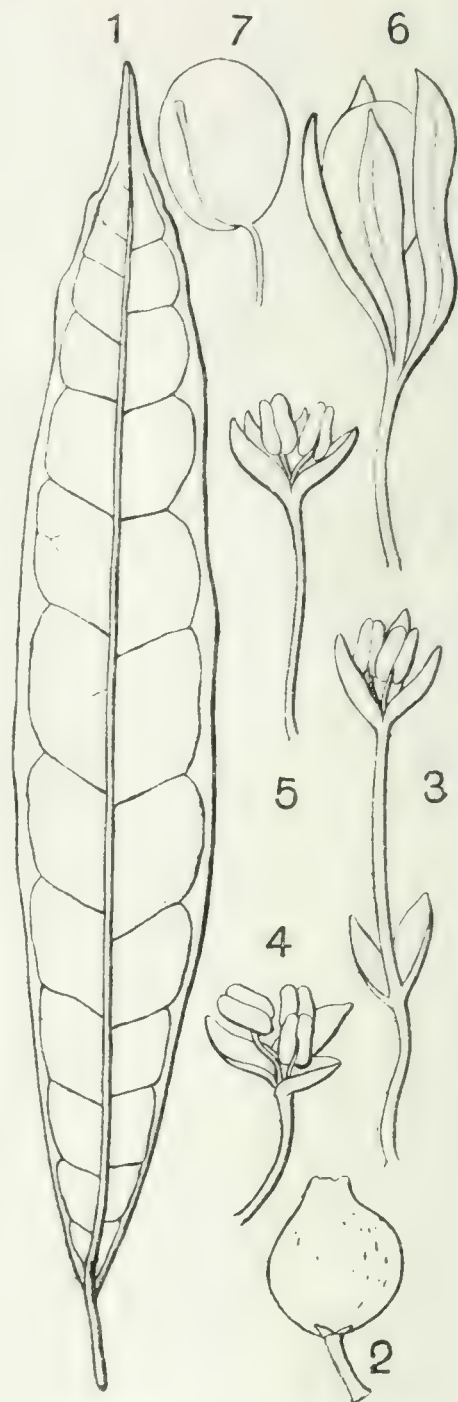


Fig. 41; *Ficus formosana* MAXIM. form. *Shimadai*; 1, a leaf; 2, a gall-receptacle; 3, 4, 5, male flowers, seen from different sides; 6, a gall-flower; 7, a gall-ovary.

Near *F. Swinhoei* KING.; but differs from it in the obovate leaves with

the much more rounded apex and the much more cuneate base.

10. *Ficus retusa* LINN.; HAYATA l. c. p. 69.

11. *Ficus cuspidato-caudata* HAYATA sp. nov. (Fig. 43) Arbor radices aërias haud emittens 70–80 ped. altus, ramis fulvo-cineraceis rugulosis lenticellis minutis notatis. Folia coriacea oblonga vel obovato-oblonga 6–7 cm. longa 4–4½ cm. lata apice subito cuspidato-caudata, (caudis circ. 1 cm. longis 2 mm. latis apice obtusis), basi acuta margine integra, venis venulisque supra mi-

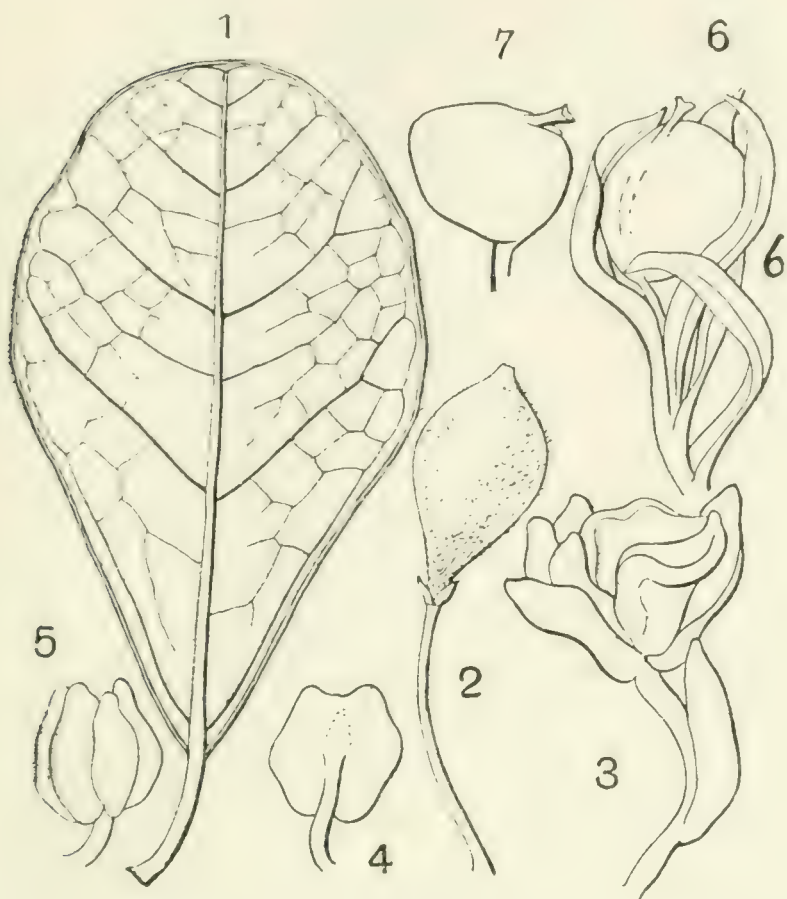


FIG. 42; *Ficus garanbiensis* HAYATA; 1, a leaf; 2, a receptacle; 3, a male flower; 4, 5, stamens; 6, a gall-flower; 7, a galliferous ovary.

nus subtus plus distincte elevatis, venis lateralibus primariis utroque latere costæ 8–9, venis secundariis cum primariis parallelis, venis tertianis minute distincteque reticulatis, petiolis 2½–3 cm. longis. Receptacula plus minus depressa globosa 6–7 mm. longa 7–8 mm. lata ad apicem subplana ad centrum tenuiter depressa basi sessilia subplana ad latus ramulorum oppositim sita glabra lævia, bracteis ad basin receptaculi 3 ovato-triangularibus 2 mm. longis. Fl. gall. breve pedicellati, pedicellis 1 mm. longis glabris, perianthii segmenta 3 obovata 1 mm. longa apice rotundata. Ovarium (gall.) obovoideum 1 mm. longum vel ovoideum. Receptaculum intus glabrum.

HAB. Kwashōtō, leg. T. SŌMA, Juli. 1913.

Near *F. Benjamiana* LINN.; but differs from it in having much more narrowly cuspidate leaves with more or less cuneate base. This new species

is easily distinguishable from *F. retusa* in not having fibrous aerial roots and in the cuspidate leaves.

12. **Ficus Wightiana** WALL.; HAYATA l. c. p. 70.

13. **Ficus vasculosa** WALL.; HAYATA l. c. p. 70.

14. **Ficus leucantatoma** POIR.; HAYATA l. c. p. 69.

*Ficus fistulosa* MATSUM. et HAYATA Enum. Pl. Formos. p. 377 (non REINW.).

*F. Oldhami* HANCE.; HAYATA Gen. Ind. Fl. Formos. p. 69.

*F. rapiformis* HAYATA in Gen. Ind. Fl. Formos. p. 69 (non Roxb.)

15. **Ficus Harlandli** BENTH.; HAYATA l. c. p. 69.

HAB. Kussaku, Karapin, Teraso, Kusu-kusu, Hiiranzan.

This species is easily distinguished from *F. obscura* in the leaves which in *F. Harlandi* are usually pinninerved, but in *F. obscura* are 3-nerved at the base.

16. **Ficus nervosa** HEYNE.; HAYATA l. c. p. 69.

17. **Ficus koshunensis** HAYATA (Fig. 44) l. c. p. 69.

18. **Ficus Beecheyana** HOOK. et ARN.; HAYATA l. c. p. 69.

19. **Ficus Swinhœi** KING. (Fig. 45); HAYATA l. c. p. 69.

20. **Ficus Kingiana** HEMSL. (Fig. 46) in HOOK. Ic. Pl. t. 2535; MATSUM. et HAYATA Enum. Pl. Formos. p. 380; HAYATA Gen. Ind. p. 69.

HAB. Kōshūn, Kuraru, leg. B. HAYATA, Juni. 1912.

Comparable to some extents to *F. gibbosa* BLUME.; but differs from it in having much more smaller leaves.

21. **Ficus gibbosa** BL.; HAYATA l. c. p. 69.

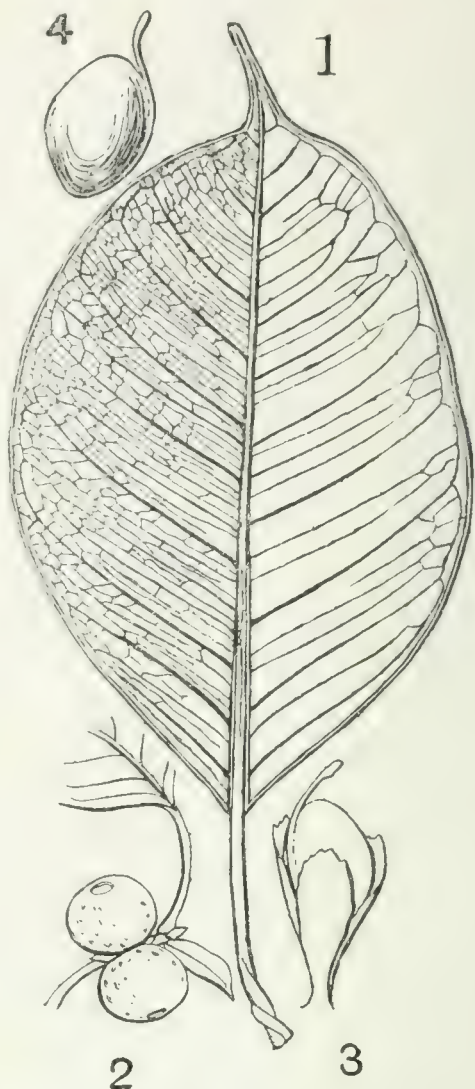


Fig. 43; *Ficus cuspidato-caudata* HAYATA; 1, a leaf; 2, receptacles; 3, a gall-flower; 4, galliferous ovary.



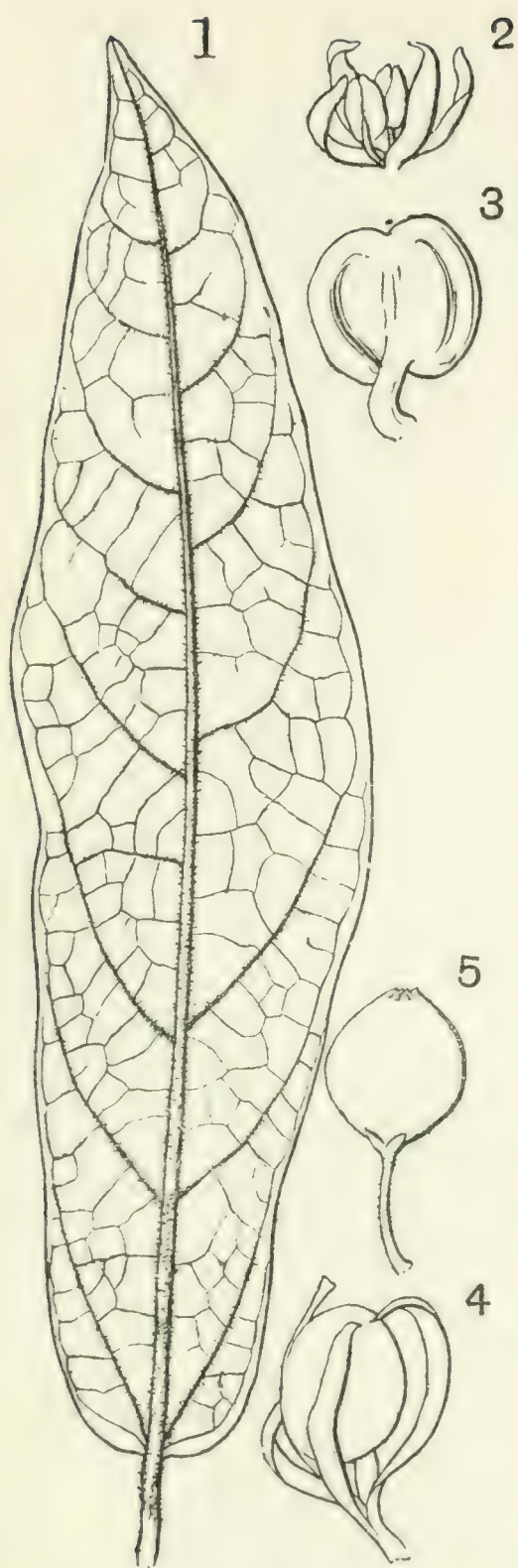


Fig. 44, *Ficus koshunensis* HAYATA; 1, a leaf; 2, a male flower; 3, a stamen; 4, a gall-flower; 5, a receptacle.

basi receptaculi triangularibus dense brevique hirsutis.

22. *Ficus Kusanoi* HAYATA (Fig. 47)  
l. c. p. 69.

23. *Ficus Somai* HAYATA.  
sp. nov. (Fig. 48).

Frutex; rami graciles scaberrimi haud lenticellati rubescentes. Folia ovato-lanceolata valde obliqua 16 cm. longa  $4\frac{1}{2}$  cm. lata apice acuminata vel caudato-acuminata basi inaequalia

latere inferiore obtusa vel rotundata latere superiore acuta margine medio subintegra, costa cum venis utraque pagine elevata, utraque pagine scaberrima basi 3-nervia chartacea vel tenuiter coriacea in exsiccato pallido-cinerascentia, petiolis 1 cm. longis. Receptaculum axillare solitarium subglobosum 1 cm. longum 8 mm. latum, pedunculis 2-3 mm. longis, bracteis

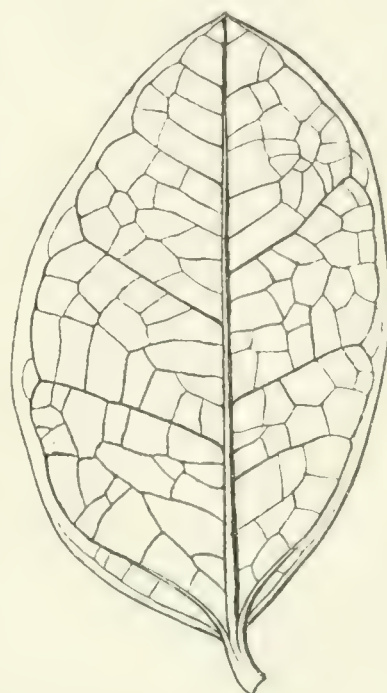


Fig. 45,  
*Ficus Swinhoei* KING.

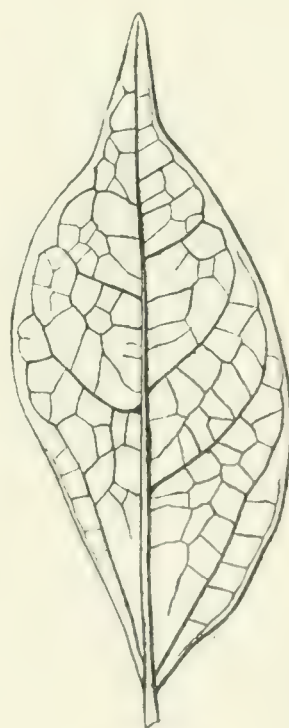


Fig. 46,  
*Ficus Kingiana* HEMSL.

Receptaculum intus hirsutum. Fl. ignoti.

HAB. Takao, leg. T. SŌMA.

Near *F. gibbosa* BLUME; but separable from it in having leaves with the oblique base which is rounded on one side but acute on the other.

24. **Ficus**

**antaensis** HA-

YATA sp. nov.

(Fig. 49) Arbor;

rami et ramuli

crassiusculi, ra-

mulis teretibus 1

cm. in diametro

sectionis, cortice

fulvo-rubescenti

ruguloso minute

lenticellato, len-

ticellis minutis

rubescentibus,

cicatricibus folio-

rum semi-rotun-

dati 5 mm. latis

notatis et cica-

tricibus stipula-

rum annulifor-

mibus. Folia

elliptica charta-

ceo-coriacea 20

cm. longa 10-13

cm. lata apice

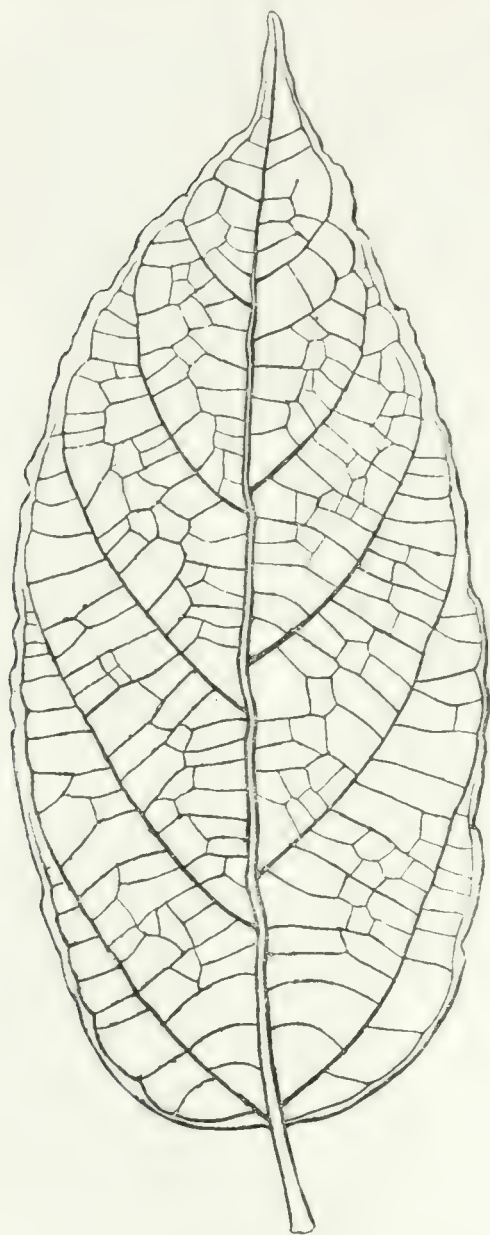


Fig. 47, *Ficus Kusanoi* HAYATA.

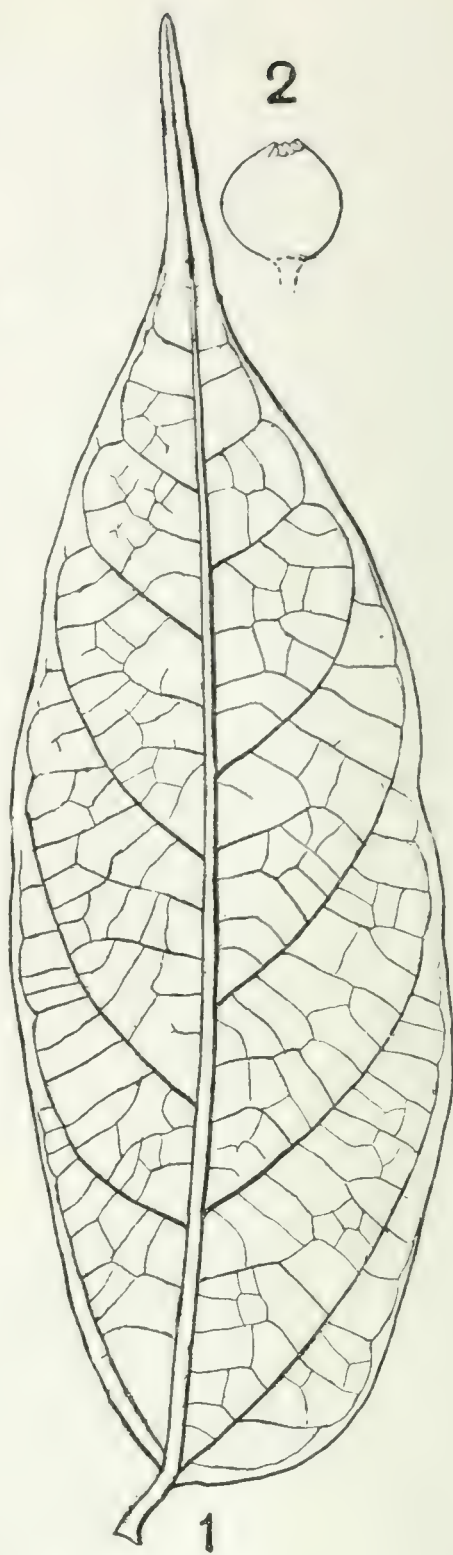


Fig. 48, *Ficus Somai* HAYATA;  
1, a leaf; 2, a receptacle.

caudato-acuta basi rotundato-truncata ad extremitatem tenuiter cordata margine subintegra vel plano-undulata utraque pagine glabra, nervis venis venulis reticulis venularum gracilibus supra tenuissime impressis subtus elevatis, 5-nervia



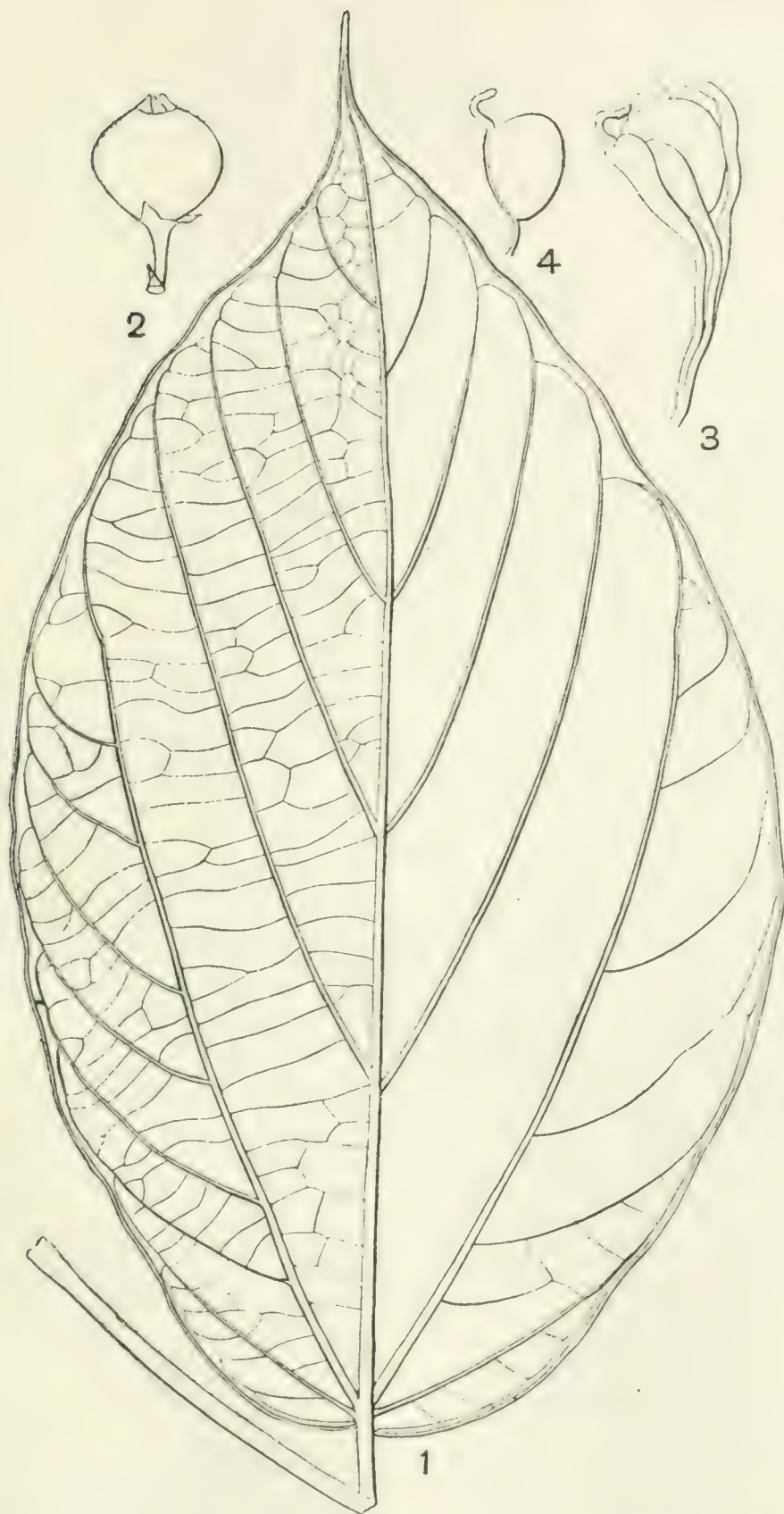


Fig. 49, *Ficus antaensis* HAYATA; 1, a leaf  $\times \frac{2}{3}$ ; 2, a receptacle  $\times \frac{2}{3}$ ; 3, a female flower; 4, an ovary.

vel 7-nervia, nervis a se angulo  $30^\circ$  egressis, nervis lateralibus extrorsum 4-veniferis, costa utroque latere 3-4 venifera, venis a costa angulo  $30^\circ$  egressis, petiolis 7-10 cm. longis teretibus, stipulis deciduis. Receptacula subglobosa 2 cm. in diametro, basi bracteis 3 dispositis triangularibus 4 mm. longis acutis depresso-hirsutis. Fl. ♀: perianthii segmenta 3-4 linearia vel spathulata 2-3 mm. longa. Achænia semi-oblonga semi-obovata  $1\frac{1}{2}$  mm. longa 1 mm. lata rugulosa.

HAB. Kōtōshō, leg. S. SASAKI, Juli. 1912.

Near *Ficus hiiraensis* HAYATA; but differs from it in having oblong leaves.

25. ***Ficus hiiraensis*** HAYATA sp. nov. (Fig. 50). Arbor, cortice pallido-cinereo. Ramuli validius-



culi teretes 13 mm. crassi, cortice cinerascenti, minute lenticellato, lenticellis rotundatis elevatis 1 mm. in diametro, cicatricibus foliorum semi-rotundatis 6–7 mm. latis. Folia chartaceo-coriacea rotundato-cordata vel plus minus oblongo-

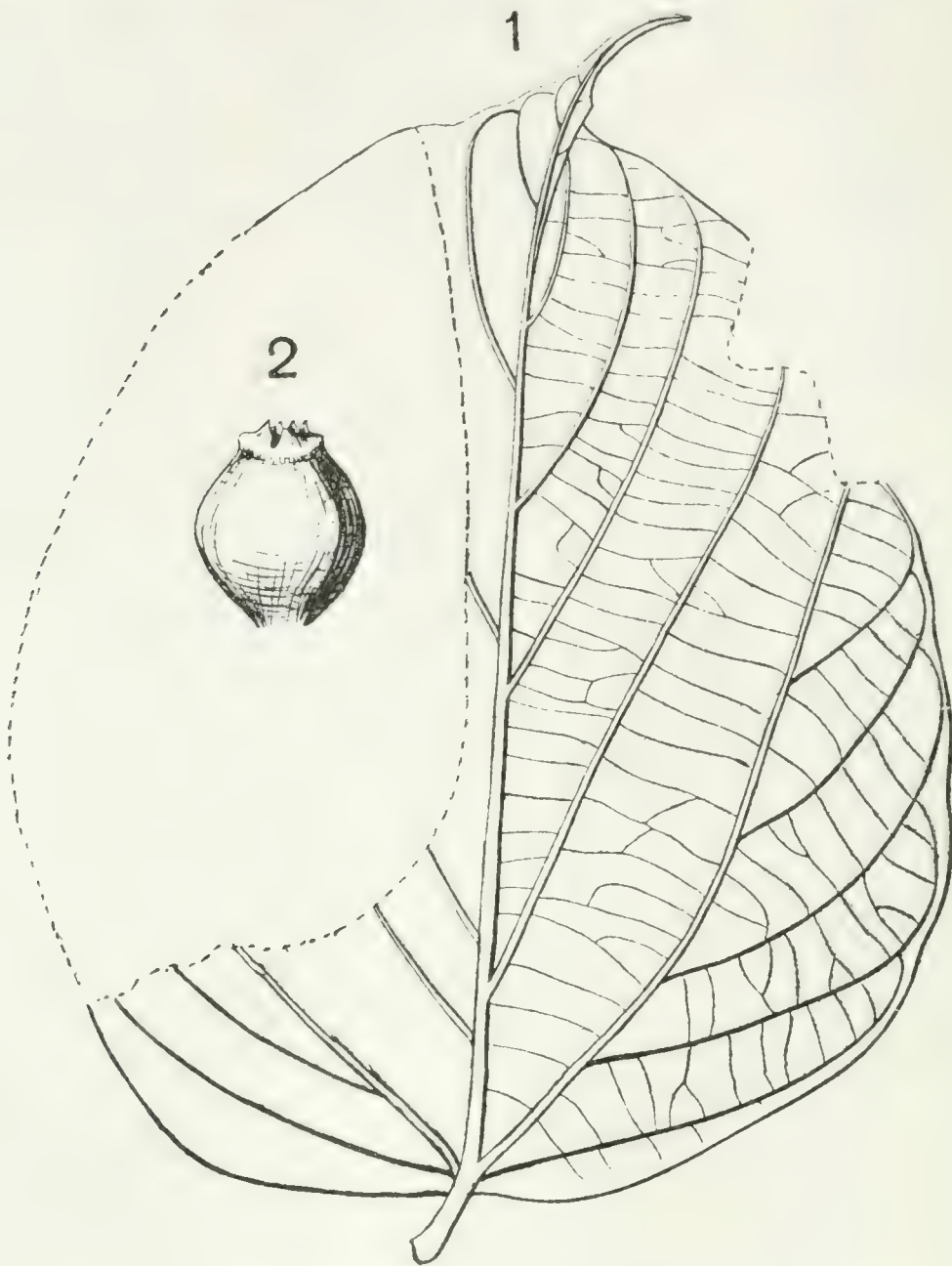


Fig. 50, *Ficus hiiranensis* HAYATA; 1, a small specimen of a leaf;  
2, a receptacle.

cordata 16–30 cm. longa 11–22 cm. lata apice acuta ad summum caudis linearibus 5–15 mm. longis instructa basi rotundata truncato-cuneata ad extremitatem tenuiter cordata margine subintegra vel obscure plane undulata utraque pagine glabra, nervis venisque supra [tenuiter impressis subtus elevatis, 5–7-

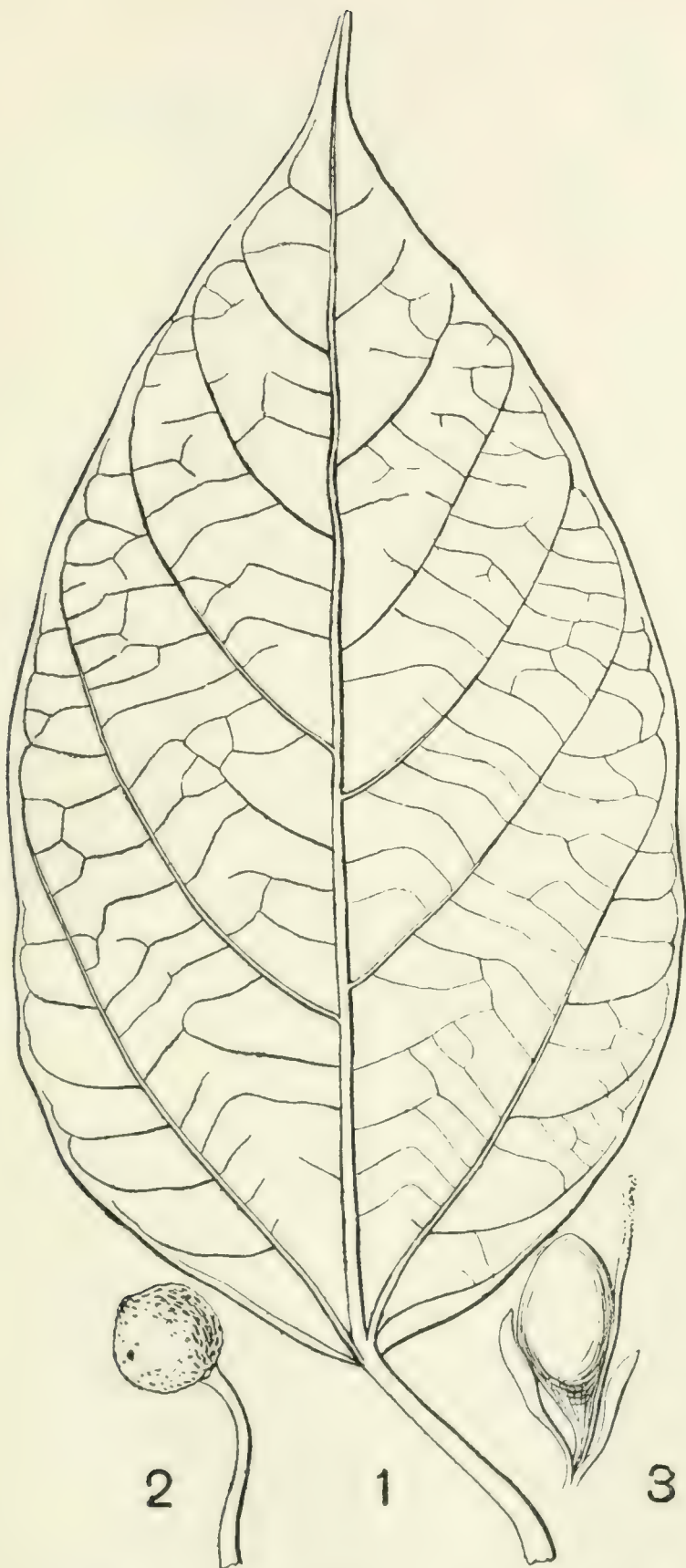


Fig. 51; *Ficus Konishii* HAYATA; 1, a leaf; 2, a receptacle; 3, a gall-flower.

nervia, nervis lateralibus a costa angulo  $30^{\circ}$ - $40^{\circ}$  egressis, petiolis teretibus 3-10 cm. longis glabris. Receptacula subglobosa extus glabra intus hirsuta. Fl. gall. breve pedicellati; perianthii segmenta 3 oblonga vel linearia; ovarium galliferum ovoideum 1 mm. longum.

*Ficus Roxburghii* HEMSLEY. Ind. Fl. Sin. II. p. 467; MATSUM. et HAYATA Enum. Pl. Formos. p. 380 (non WALL.).

HAB. Hiiranzan, leg. B. HAYATA et S. SASAKI, Juni. 1912.

This is perhaps the same species recorded from Formosa as *Ficus Roxburghii* WALL. by HEMSLEY in his "Ind. Fl. Sin." II. p. 467.

The new species differs from *F. Roxburghii* WALL. in the far much smaller receptacles. I infer that HEMSLEY must have identified his Formosan species to *F. Roxburghii* without examining receptacles. So far, we have never seen the latter in the island.

26. **Ficus Konishii** HAYATA (Fig. 51) Gen. Ind. p. 69.

27. **Ficus glochidiifolia** HAYATA sp. nov. (Fig. 52). Arbor. Folia ovata vel ovato-rhomboidea 13 cm. longa 6-9 cm. lata apice triangulari-acuta ad summum breve caudata basi truncata obtusa vel late acuta chartaceo-coriacea vel chartacea margine integra utraque pagine glabra, costis venis supra planis haud elevatis subtus distincte elevatis, subtrinervia, nervis lateralibus a costa angulo  $40^\circ$  egressis, petiolis 3-4 cm. longis teretibus glabris. Receptaculum subglobosum 1-1½ cm. in diametro. Fl. gall.: perianthii segmenta 3-5 linearia 1 mm. longa.

HAB. Hiiranzan, leg. S. SASAKI.

28. **Ficus kotœnsis** HAYATA sp. nov. (Fig. 53). Arbor. Ramuli fere graciles fulvescentes plus minus hirsuti. Folia plus minus obliqua chartacea oblonga oblongo-ovata 9-12 cm. longa 5½-6 cm. lata apice acuta ad summum brevissime caudata

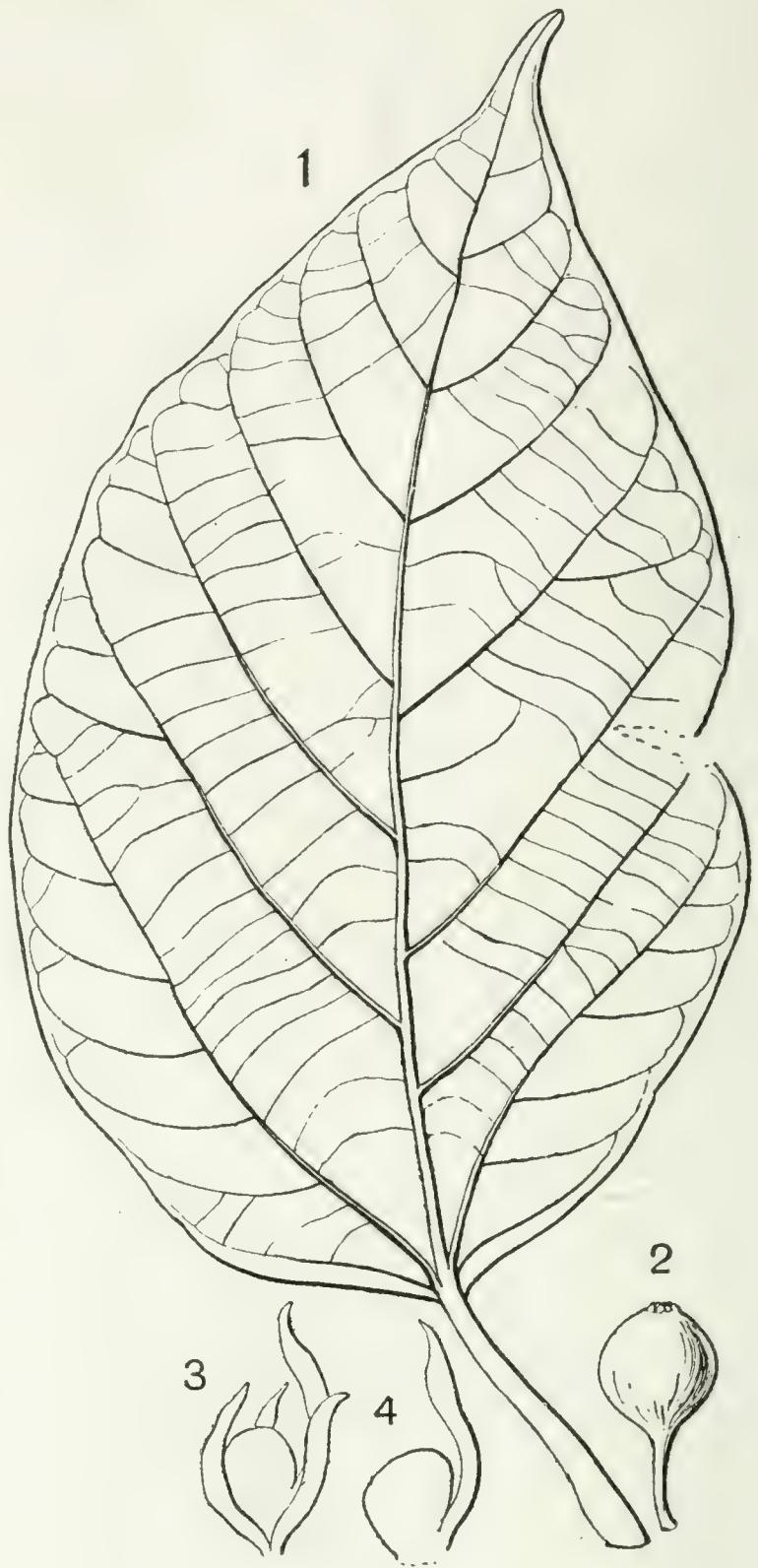


Fig. 52, *Ficus glochidiifolia* HAYATA; 1, a leaf; 2, a receptacle; 3, a female flower; 4, an ovary.



basi oblique rotundata vel cordata vel uno latere acuta uno latere rotundata

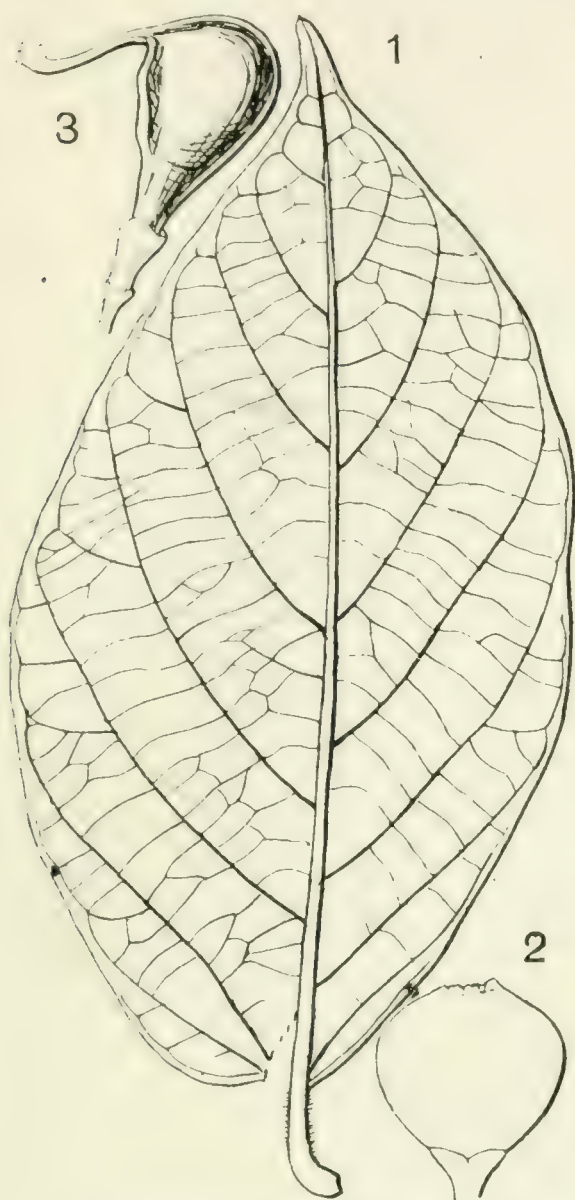


Fig. 53, *Ficus kotoensis* HAYATA;  
1, a leaf; 2, a receptacle; 3, a female  
flower.

margine subintegra supra glabra subtus ad costas venasque hirsuta basi subtrinervia vel pinnivena, costis venis supra planis vel vix impressis subtus elevatis, venis lateralibus primariis utroque latere costae 5-6 arcuatis, petiolis 1-1½ cm. longis fulvo-hirsutis subteretibus. Receptacula subglobosa 1½ cm. in diametro, basi bracteis 3 dispositis obtuso-triangularibus margine plus minus ciliolatis. Fl. ♀: pedicellis ⅔-1 mm. longis glabris, perianthia haud lobata globoso-tubulosa vel campanulata membranacea hyalina ad oria integra ⅓-⅔ mm. longa. Ovarium oblique globosum ½ mm. longum, stylo oblique sito apice hirsuto 1-1¼ mm. longo. Achaenium oblique obovoidum 1 mm. longum basi plus minus stipitatum.

HAB. Kōtōshō, leg. S. SASAKI.

29. ***Ficus kaukauensis*** HAYATA  
(Fig. 54) Ic. Pl. Formos. VII. p. 35.

30. ***Ficus ochobiensis*** HAYATA  
(Fig. 55) Ic. Pl. Formos. VII. p. 36.

***Ficus Katsumadai*** HAYATA sp. nov. (Fig. 56). Frutex; rami graciles teretes fusco-rubescens longitudinaliter rugulosi. Folia membranacea vel chartacea oblongo-lanceolata 14 cm. longa 5 cm. lata apice acuminata vel acuminatissima basi ad extremitatem tenuiter cordata margine subintegra vel versus basin tenuiter dentata supra scaberrima subtus scabra basi 3-nervia, petiolis 1½-4 cm. longis. Receptaculum axillare solitarium subglobosum 1 cm. in diametro extus patento-hirsutum intus dense hirsutum. Fl. gall. plus minus pedicellati; perianthii segmenta 3-4 linearia 1½ mm. longa apice acuminata. Ovarium galliferum subglobosum minus quam 1 mm. in diametro.

HAB. Hainan, leg. Z. KATSUMADA.

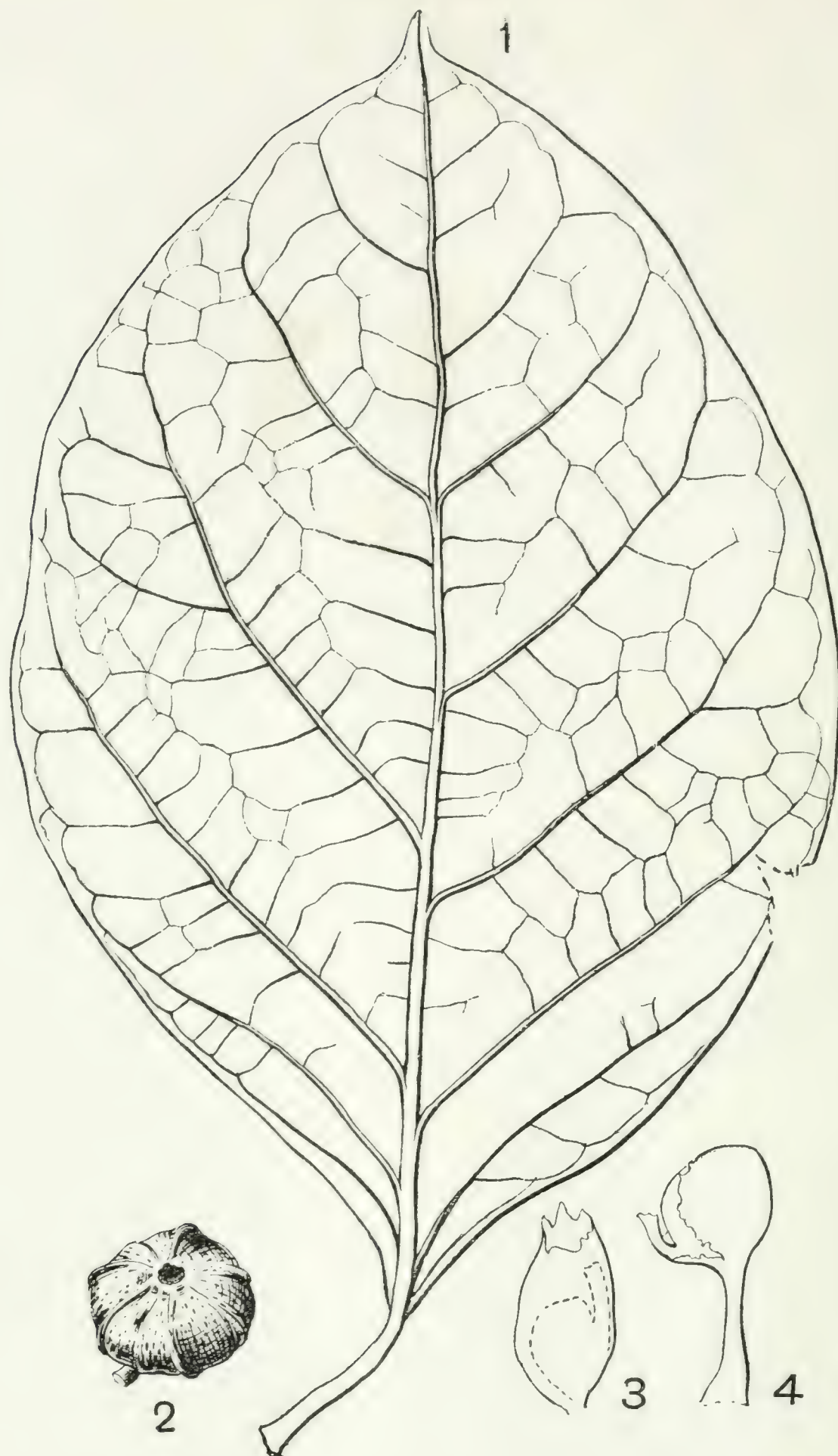
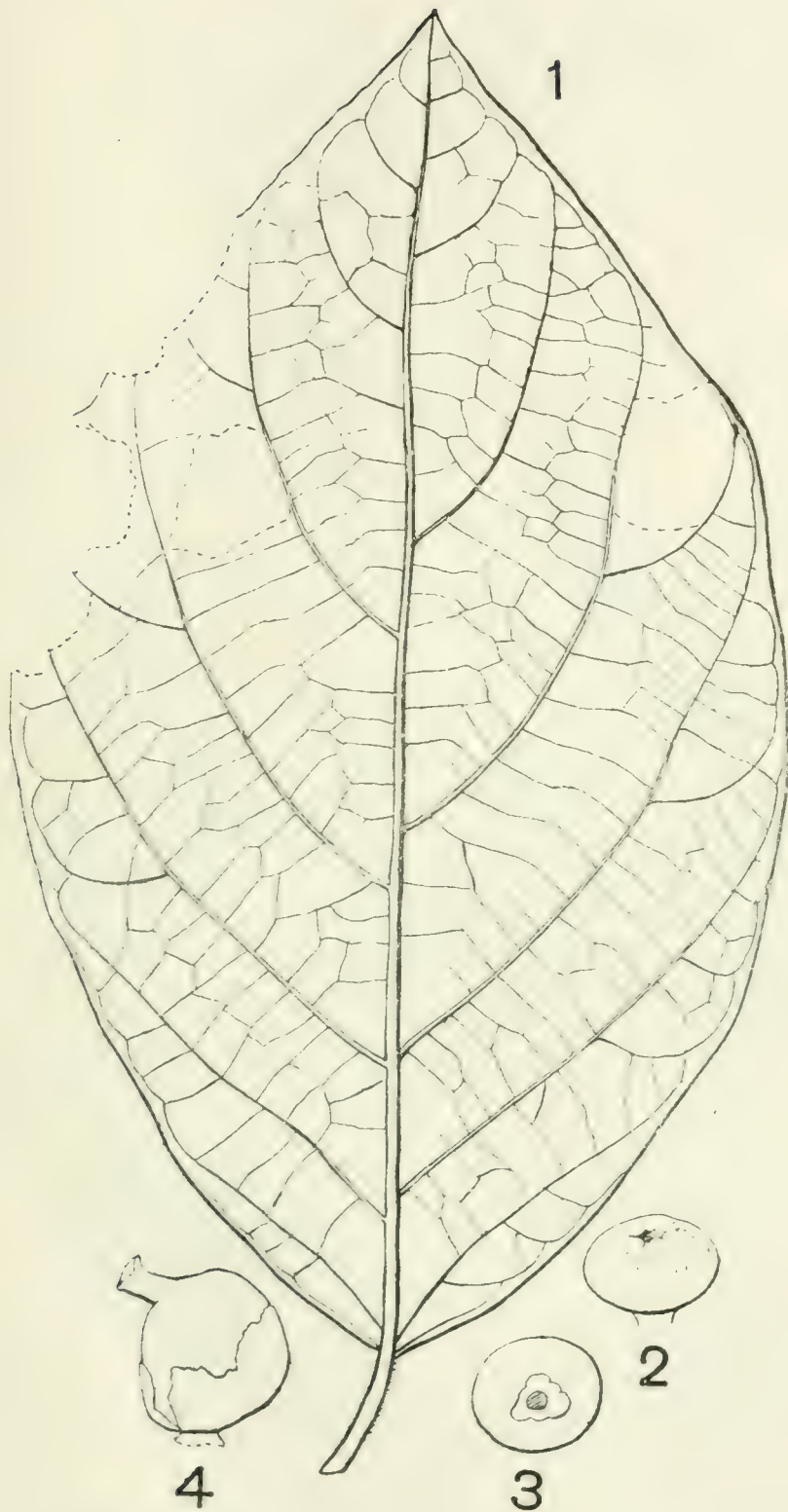


Fig. 54, *Ficus kaukauensis* HAYATA; 1, a leaf; 2, a receptacle; 3, a young gall-flower; 4, a mature gall-flower.



6 Fig. 55, *Ficus ochobiensis* HAYATA; 1, a leaf; 2, 3, a young receptacle, seen from different sides; 4, a female flower.

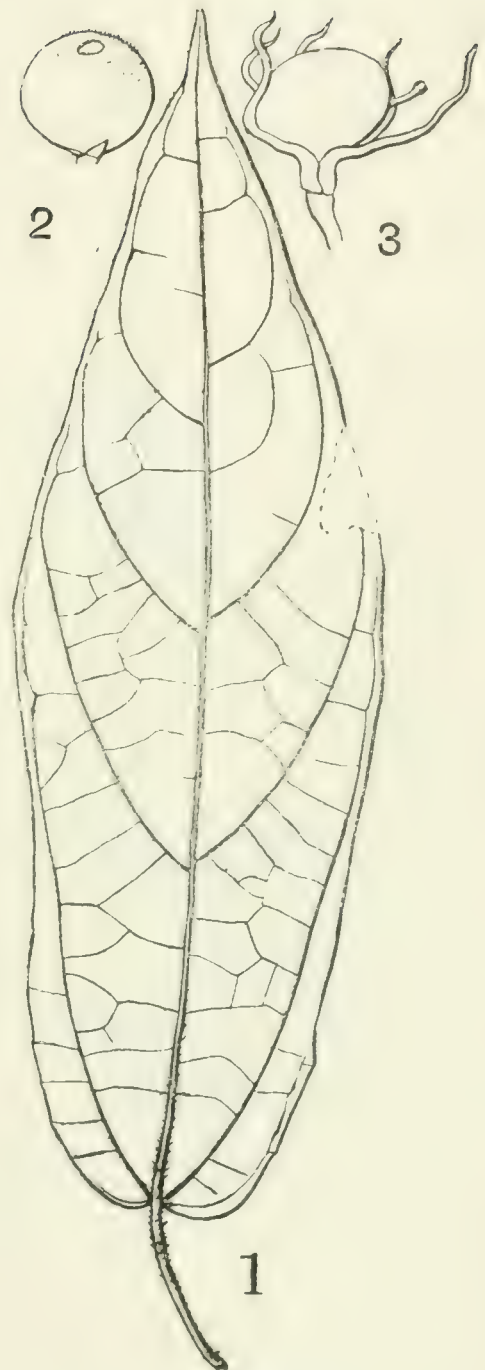


Fig. 56, *Ficus Katsumadai* HAYATA; 1, a leaf; 2, a receptacle; 3, a gall-flower.



## Ceratophyllæ.

*Ceratophyllum* LINN.

**Ceratophyllum pentacanthum** HAYATA sp. nov. (Fig. 57—a) *C. demersum* HAYATA Gen. Ind. Fl. Formos. p. 73 (non LINN.).

Fructus oblongus plus minus complanatus 4 mm. longus 2 mm. latus apice basi latereque spinosus, spinis apicalibus et basilaribus æquilongis 12 mm. longis, spinis lateralibus 7 mm. longis. Cæterum ut *Ceratophylli demersi*.

HAB. Taihoku, leg. T. MAKINO, Nov. 1896.

Differs from all the species known to us in having fruits with 5 spines.

**Ceratophyllum submersum** LINN. (Fig. 57—b); SOWERBY English Botany VIII. p. 124, t. 1277; THOME Fl. Deutsch. Ost. Schw. II. p. 121.

HAB. Matō, leg. Y. SHIMADA,

Oct. 1915.

Easily distinguished from *C. demersum* by the unarmed fruits. New to the flora of Formosa.

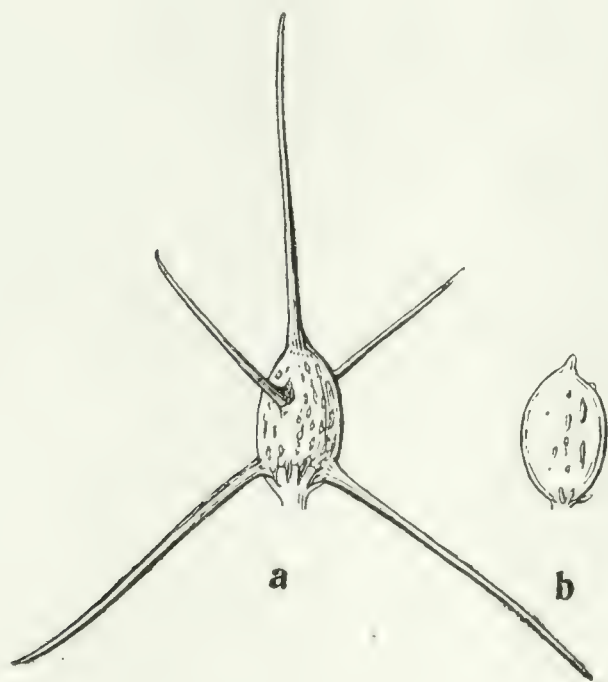


Fig. 57; a, a fruit of *Ceratophyllum pentacanthum* HAYATA; b, a fruit of *Ceratophyllum submersum* LINN.

## Orchideæ.

*Sarcanthus* LINDL.

**Sarcanthus uraiensis** HAYATA sp. nov. (Fig. 58) Epiphytica. Caulis 30–40 cm. longus glaber teres suberectus flexuosus. Folia alterna linearia 20 cm. longa 2 cm. lata apice obtusa ad summum inæqualiter 2-lobata, lobo altro

subnullo, altro 1–2 mm. longo, crassiuscula basi plus minus contracta margine integra sessilia glabra. Racemi oppositifolii 12 cm. longi paucè ramosi, bracteis minutis, pedicellis (vel ovariis) 2 mm. longis. Sepalum posticum late oblongum 4 mm. longum 3 mm. latum apice obtusissimum, lateralia oblongo-linearia 4 mm. longa 2 mm. lata apice obtusissima. Petala oblique oblonga  $2\frac{1}{2}$  mm. longa

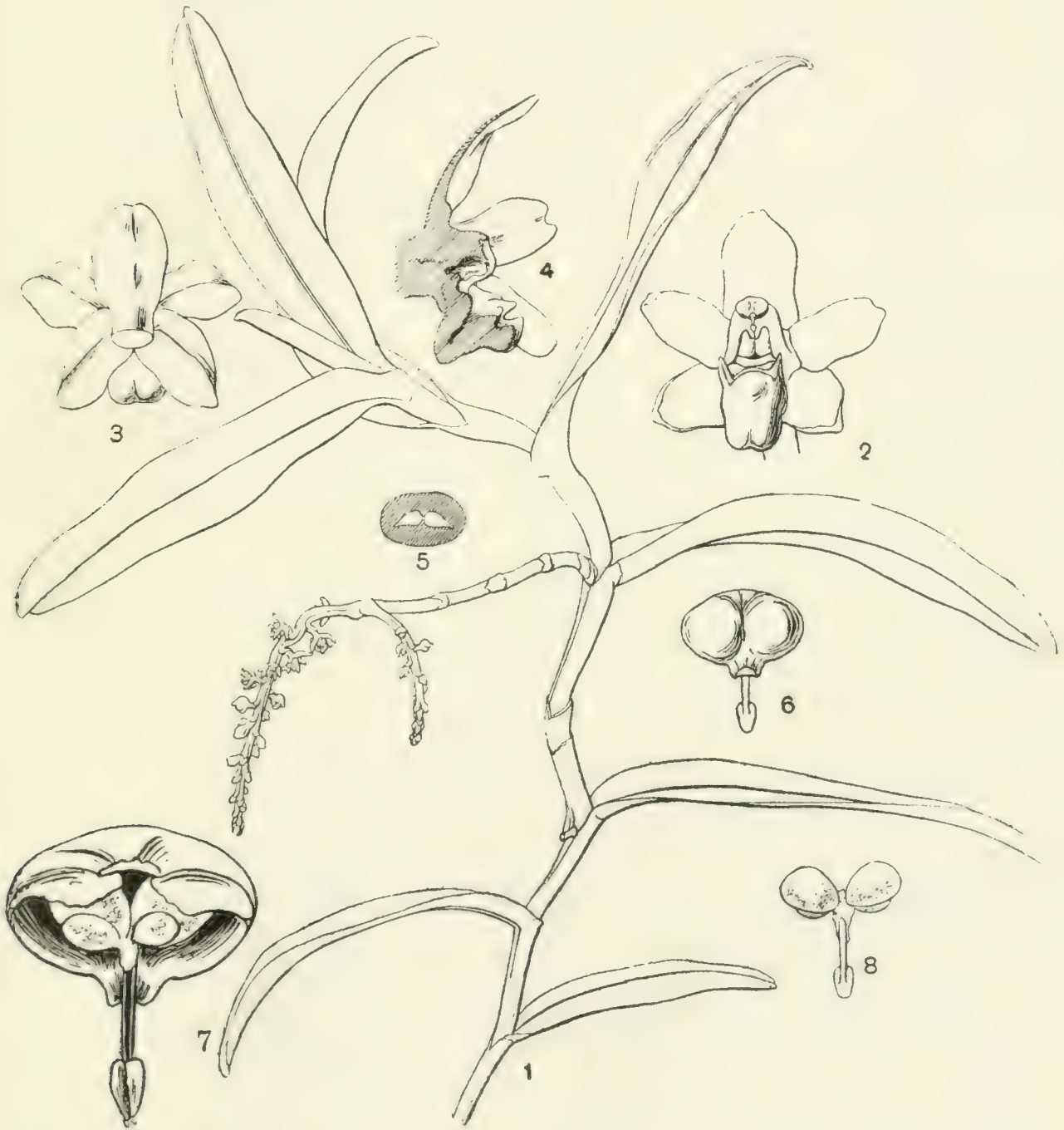


Fig. 58, *Sarcanthus uraiensis* HAYATA; 1, the plant  $\times \frac{1}{2}$ ; 2, a flower; 3, the same flower, seen from back; 4, the same, in vertical section; 5, cross section of the basal sac of the labellum; 6, an anther; 7, the same, seen from back; 8, pollinia.

1½ mm. lata apice obtusissima. Labellum 3-lobatum, lobis lateralibus minutis oblique triangularibus 1 mm. longis 1½ mm. latis acutis, lobo terminali brevissimo valde incrassato rotundato 1 mm. in diametro. Columna 1 mm. longa.

HAB. Urai, leg. B. HAYATA.

*Pleione* DON.

**Pleione Pricei** ROLFE in Bot. Mag. t. 8729 (1917).

HAB. Arisan ?

Differs from *P. formosana* HAYATA in the single-flowered scape, in the much shorter bracts and in the 2-lamellate lip-disc.

Pandaneæ.

*Pandanus* LINN. f.

**Pandanus tectorius** SOL. "Prim. fl. ins. paci. f. ined. 350"; "PARKINSON Journ. of a Voy. to the South Sea in H. M. S. the Endeavour (1773)": WARB. Pfl.-reich. IV.—9, Pandanaceæ p. 46.

*Pandanus odoratissimus* LINN. f.: FORBES et HEMSL. Ind. Fl. Sin. III. p. 171; MATSUM. et HAYATA Enum. Pl. Formos. p. 455.

Aroideæ.

*Arisaema* MART.

**Arisaema Takeoi** HAYATA (Fig. 59) Ic. Pl. Formos. V. p. 246. Descriptio aucta: Spadix ♀ basi erectus medio subito recurvus reflexus apice filiformis 30–40 cm. longus, partibus ovariiferis 3–4 cm. longis.

HAB. Inter Heirinbi et Shōkei, leg. B. HAYATA, Mai. 1916.

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**Pandanus tectorius** SOL. var. *β. liukiuensis* WARB. "Folia minora angusta flabello longo terminata, spinis marginalibus quam in typo majoribus armata. Phalanges minores pauci—(5–6) locales. Foliis basi tantum et breviter spinulosis."

"Liukiu auf Miyakeshima und Ischigaki z. B. dichte Strandgebüsche bildend (WARBURG)."



*Colocasia* SCHOTT.

***Colocasia formosana* HAYATA** sp. nov. (Fig. 60). Rhizoma suberectum crassum 10 cm. longum 3 cm. crassum radices teretes 2 mm. crassas multo gerens. Folia ad apicem rhizomatis 3-4 insita longe petiolata, petiolis erectis 50-60 cm. longis glabris pallido-viridibus, laminis ovatis 30-40 cm. longis 20-25 cm. latis apice triangulari-acutis basi cordatis peltatis, sinibus cordis 5 cm. profundis, membranaceis. Scapi erecti recti, pedunculis 20-30 cm. longis. Spatha 15-20 cm. longa convoluta, in convoluto 1 cm. lata, apice acuminata loco a basi ad 5 cm. altitudinem leviter constricta. Spadix 13-15 cm. longus, parte inferiore ovariifera 4-5 cm. longa cum ovariis 7 mm. lata; ovarium cum staminodiis intermixtum latere compressum globoso-conicum, stigmate peltato sessili rotundato 4-lobato vel elobato; parte ovariifera apice gradatim ad partem neutralem abeunti; parte neutrali 1 cm. longa 2 mm. lata apice gradatim ad partem staminiferam abeunti;

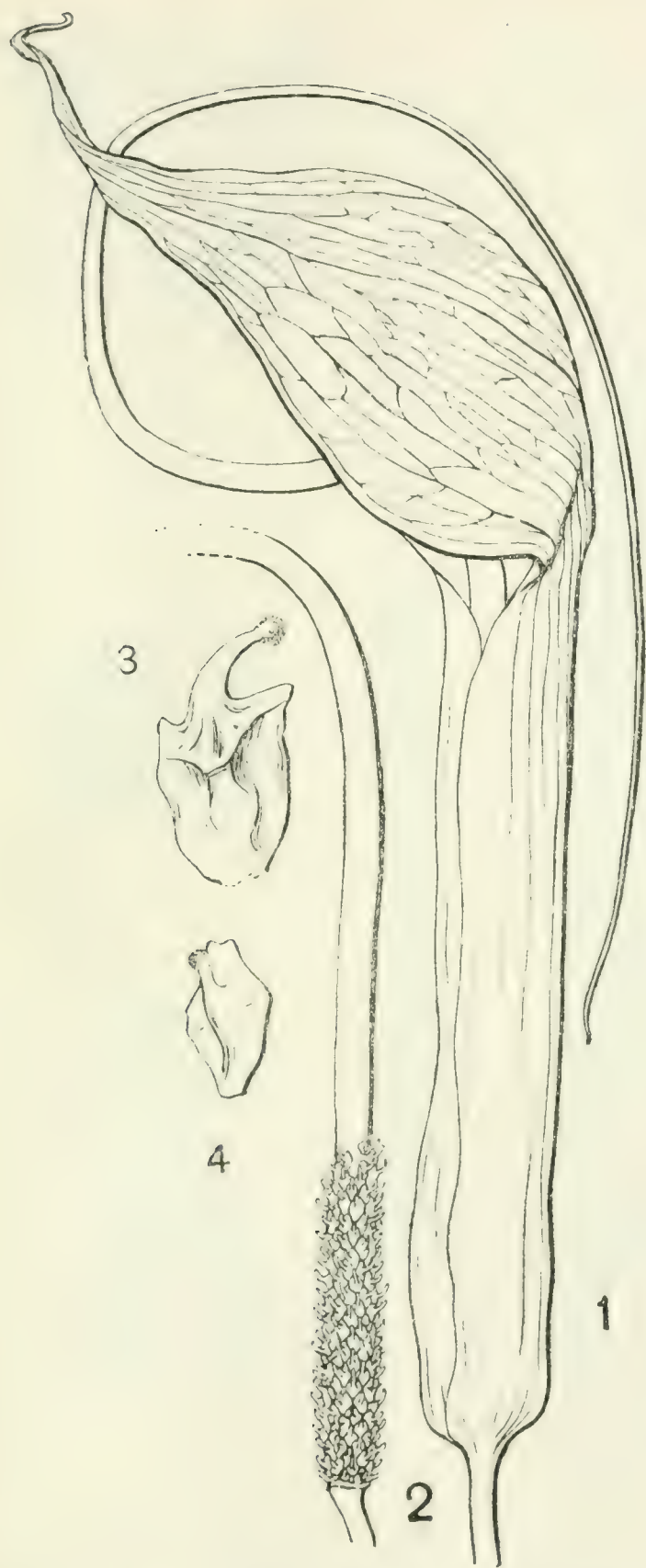


Fig. 59, *Arisaema Takoi* HAYATA; 1, a spathe with spadix; 2, basal portion of a spadix; 3, ovary; 4, the same, seen from above.

parte staminifera 3 cm. longa cum staminibus 5 mm. lata; staminibus dense dispositis; stamina generaliter 4-connata synandrium formantia; synandrium late stipitatum, stipitibus  $\frac{1}{2}$  mm. longis 1 mm. latis valde complanatis, late cylindricum  $1\frac{1}{2}$  mm. latum 1 mm. longum apice perfecte truncatum; parte staminifera apice abrupte appendice terminata; appendix cylindrica 3 cm. longa 3 mm. lata apice obtusa basi contracta rugulosa.

HAB. Urai, leg. B. HAYATA et T. SŌMA, Mai. 1916.

Near *C. antiquorum*, but differs from it in the existence of neutral ovaries between fertile ones. This is not eaten by any native of the island.

**Colocasia Konishii** HAYATA sp. nov.  
Folia longe petiolata, petiolis 50 cm. longis plus

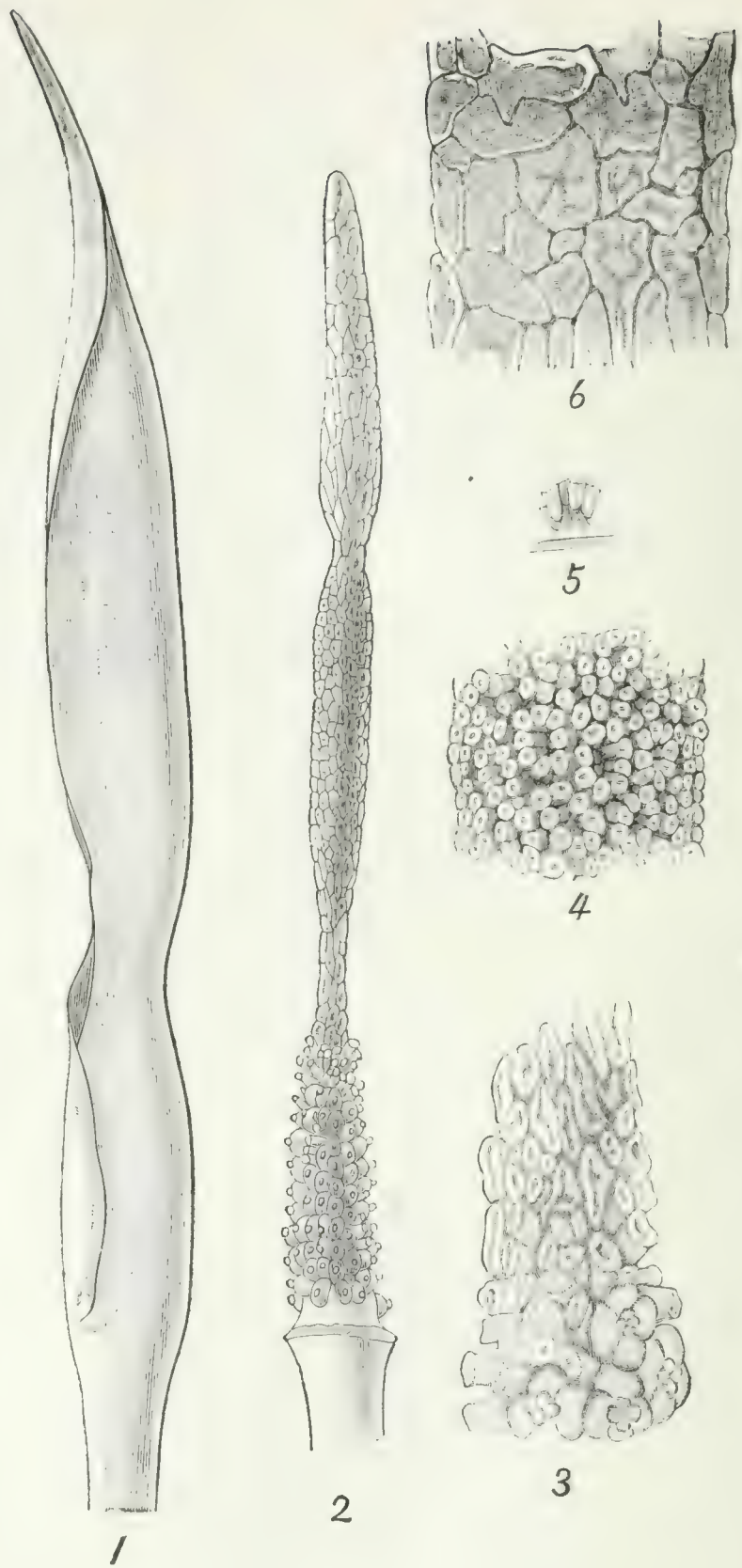


FIG. 60, *Colocasia formosana* HAYATA; 1, a spatha; 2, a spadix; 3, an apical portion of the ovariiferous part; 4, a portion of the staminiferous part; 5, a synandrium; 6, a portion of the appendage.

minus rubescentibus; lamina ovata peltata 25 cm. longa 18 cm. lata membranacea margine integra apice rotundata apiculata basi peltata cordata. Scapus 30 cm. —40 cm. longus; spatha 18–20 cm. longa convoluta loco a basi ad 5 cm. altitudinem plus minus constricta. Spadix 12 cm. longus, parte inferiore ovariifera, superiore staminifera, ad summum appendice cylindrica acuta  $2\frac{1}{2}$  cm. longa 5 mm. lata minute botryoideo-rugulosa terminatus; parte ovariifera 2–3 cm. longa cylindrica cum ovariis 4–5 mm. lata, (ovariis dense dispositis depressis latere compressis, stigmatibus peltatis rotundatis complanatis), apice angustata demum dilatata ad partem staminiferam abeuns; parte staminifera cylindrica 3–4 cm. longa; synandriis 6–8-antheriferis cuneato-cylindricis  $1\frac{1}{3}$  mm. longis sessilibus 1 mm. latis apice perfecte truncatis 6–8-poriferis; parte staminifera 3–4 cm. longa 7–8 mm. lata apice contracta.

HAB. Urai, leg. S. KONISHI.

Differs from *C. formosana* in the absence of staminodes between the ovaries, and in the very minutely botryoidally rugose appendages.

*Homalomena* SCHOTT.

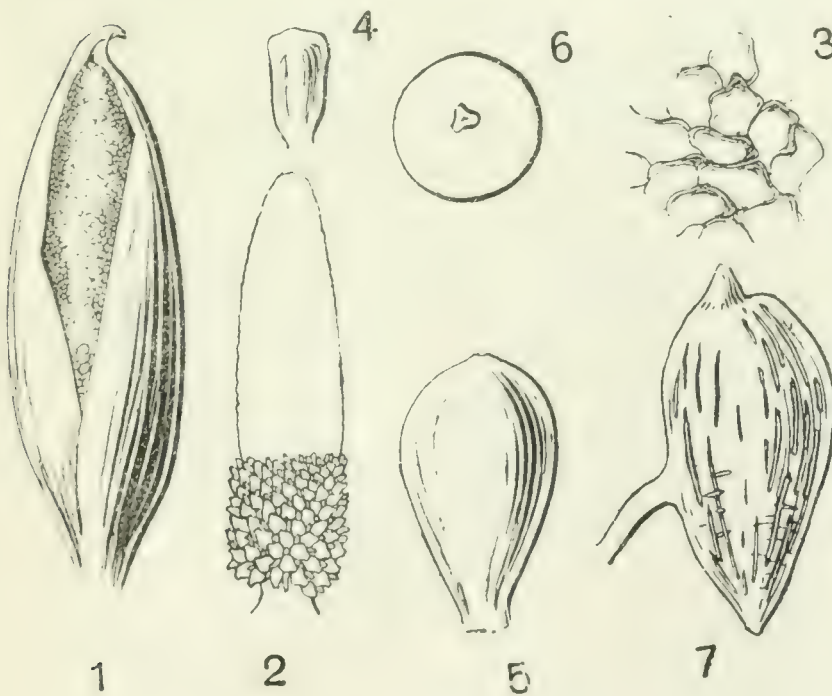


Fig. 61, *Homalomena kelungensis* HAYATA; 1, a spadix in a spatha; 2, the same spadix; 3, a part of the staminiferous portion; 4, a stamen; 5, an ovary; 6, [the] same, seen from above; 7, an ovule.

**Homalomena kelungensis** HAYATA sp. nov. Rhizoma suberectum? Folia ad apicem rhizomatis 4–5 equitantim disposita; petiolis 60 cm. longis basi dilatatis basin foliorum altiorum amplexantibus; lamina late ovata 33 cm. longa 25 cm. lata apice triangulari-acuta basi sagittato-cordata margine integerrima membranacea, venis nervisque fere parallelis.



Spadix longe pedunculatus cum pedunculo 40 cm. longus apice pedunculi nutans. Spatha 6 cm. longa apice acuta margine valde imbricata. Spadix erectus cylindricus 4–5 cm. longus 12 mm. latus apice obtusus haud appendiculatus; parte ovariifera inferiora 12 mm. longa 12 mm. lata; parte staminifera superiora 3 cm. longa 13 mm. lata apice obtusissima; ovarium cum staminodiis intermixtum obovoideum sessile  $2-2\frac{1}{2}$  mm. longum apice obtusum stigmatiferum; staminodiis clavatis 2 mm. longis; stamina distincta dense disposita sessilia complanata  $1\frac{1}{2}$  mm. longa 1 mm. lata apice truncata, anthera 2-locularis.

HAB. Kelung, Senton, leg. B. HAYATA, Mart. 1916; S. FUJII, 1917.

Near *H. rubescens* (WIGHT Ic. t. 807; ENGLER Pfl.-fam. II.—3, p. 131, fig. 84), but differs from it in the pale green spathe.

***Remusatia* SCHOTT.**

In ENGLER Natürl. Pfl.-fam. II.—3, p. 139.

***Remusatia formosana* HAYATA sp. nov.** Epiphytica; tuber depressoglobosum supra stolones radiatim emittens basi radiciferum; stolones 20–60 cm. longi versus apicem corpora aggregata gerentes 5–6-radiatim ex apicem tuberis oriundi. Folia 2–3 ex apice tuberis oriunda, petiolis 30–44 cm. longis, lamina ovata 20 cm. longa 13 cm. lata apice cuspidato-acuta basi peltata et cordata margine integerrima.

HAB. Keitao, leg. B. HAYATA, Mai. 1916.

Resembles *Remusatia vivipara* SCHOTT. in the venation of the leaves and in the viviparous shoots. It grows in the mountainous regions of Formosa and was found on the trunk of a large tree. The viviparous shoots were collected and sent to me several times, long before its mother-stock was found by myself. It has very peculiar shoots, (or stolones) radiating from the apex of the mother stock before the ordinary shoot of the stock comes out.

**Hymenophyllaceæ.**

***Hymenophyllum* LINN.**

***Hymenophyllum constrictum* HAYATA Gen. Ind. p. 100.**

*Hymenophyllum punctisorum* ROSENST. Hedwigia Band 56, p. 333.

in monte Arisan, ad arborum ramos, V. 1914, leg. U. FAURIE, No. 302.

Polypodiaceæ.

*Aspidium* SWARTZ.

***Aspidium kwanonense*** HAYATA sp. nov. (Fig. 61-62). Rhizoma suberectum. Stipes 20-25 cm. longus rubro-purpureus nitidus basi dense squamatus,



Fig. 61, *Aspidium kwanonense* HAYATA  $\times \frac{1}{2}$

(squamis linearibus 8 mm. longis 1 mm. latis acuminatissimis fusco-rubrescentibus subintegris). Frons pinnata in ambitu triangulari-ovata 40 cm. longa 30 cm. lata apice acuta basi cordata, pinnis infimis longissimis triangularibus pinnatifidis patentibus 15–20 cm. longis 12 cm. latis apice acuminatis falcatis recurvis, segmentis infimis longissimis linearibus 7 cm. longis 2–2½ cm. latis apice acutis basi

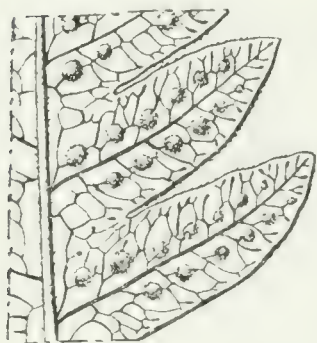


Fig. 62, *Aspidium kwarenkense* HAYATA.

plus minus contractis margine lobulatis, lobulis oblongis apice rotundatis 5 mm. longis totiusque latis; textura tenuiter membranacea; utraque pagine plus minus minute hirsuta. Sori versus apicem lorum pinnarum dispersi cordati 1–½ mm. in diametro; indusium cordatum membranaceum versus centrum hirsutum margine erosum plus minus hirsutum.

HAB. Prope cataractam Kwanon, (Nantō), typus! leg. S. FUJII, 1907; Arisan, leg. U. FAURIE; Raisha.

Near *A. Merrillianum* of the Philippines.

***Aspidium kwarenkense* HAYATA** sp. nov. Rhizoma crassum erectum apice densissime squamatum. Stipes 50 cm. longus minute hirsutus, pilis rubescentibus, atropurpureus vel atratus nitidus basi plus minus squamatus, squamis linearibus 3–10 cm. longis ¼–1 mm. latis acuminatissimis fusco-rubrescentibus, cellulis linearibus. Frons in ambitu ovata 40–50 cm. longa 30–40 cm. lata pinnata, pinnis utroque latere 2–3 a se 12 cm. remotis, infimis 3-fidis vel alte 3-lobatis, lobo terminali lanceolato 20–30 cm. longo 6 cm. lato apice longe lineari-acuminatissimo basi haud contracto margine undulato-crenato, lobis lateralibus inferioribus longioribus, superioribus brevioribus lineari-lanceolatis apice acuminatissimis; petiolis pinnarum infimarum 2–3 cm. longis glabris; pinnis superioribus sessilibus; pinna terminali longissima lanceolata 20–30 cm. longa 7–8 cm. lata apice lineari-acuminatissima basi obtusa margine undulato-crenata basi utroque latere lobo lineari 8–9 cm. longo instructa; textura tenuissime membranacea. Sori ad totam paginam laxissime dispersi rotundati ½ mm. in diametro.

HAB. Kwarenkō, leg. U. FAURIE.

Differs from *A. nantōense* HAY.; by the much thinner fronds with 3-lobed basal pinnae.



**Aspidium nantœense** HAYATA sp. nov. (Fig. 63-64). Rhizoma crassiusculum suberectum. Stipes 40 cm. longus rubro-stramineus glaber basi squamatus



Fig. 63, *Aspidium nantœense* HAYATA  $\times \frac{1}{3}$

(squamis linearibus acuminatis vel obtusis 7 mm. longis 1 mm. latis fulvis margine minute ciliolatis). Frons pinnata in ambitu ovato-cordata 40 cm. longa

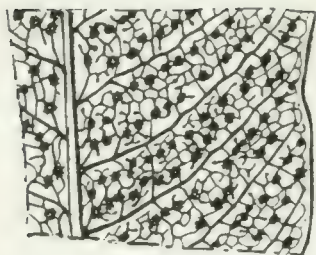


Fig. 64, *Aspidium nantense* HAYATA.

20–25 cm. lata, pinnis lateralibus utroque latere 2–4 plus minus falcatis, infimis latere inferiore pinnula una instructis; pinnis mediis lanceolatis 18 cm. longis 5 cm. latis apice acuminatis, (acuminibus linearibus), basi oblique obtusissimis sessilibus vel petiolulatis margine crenato-undulatis; textura membranaceo-chartacea; pinnis a se 7–8 cm. remotis; pagine supra glabra subtus subglabra. Sori ad totam paginam dispersi subrotundati 1 mm. in diametro.

*Polypodium Barberi* MATSUM. et HAYATA Enum. Pl. Formos. p. 628 (non Hook.)

*Aspidium Barberi* HAYATA (non C. CH.) in Gener. Ind. Fl. Formos. p. 102.

HAB. Kwanon-cataracta (Nantō), Mart. 1915, leg. S. FUJII (typus); Kwarenkō; leg. K. MIYAKE.

This was first identified with *Polypodium Barberi* Hook. It is, however, clear that the present fern is distinct from *P. Barberi* in having much broader pinnae.

***Aspidium pachinense* HAYATA sp. nov.** (Fig. 65–66). Rhizoma erecto-repens cum reliquis stipitis 2½ cm. latum. Stipes 30–70 cm.

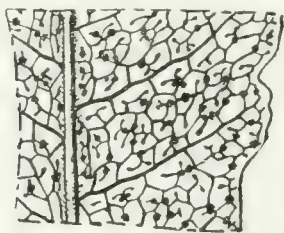


Fig. 66, *Aspidium pachinense* HAYATA.

longus minute hirsutus atro-purpureus nitidus sulcatus basi dilatatus basi dense squamatus, (squamis linearibus acuminatissimis fusco-rubescens 1 mm. latis 7 mm. longis). Frons in ambitu triangularis



Fig. 65, *Aspidium pachinense* HAYATA  $\times \frac{1}{8}$



30–40 cm. longa 35–45 cm. lata basi bipinnata, pinnis utroque latere rhachis frondis 2–3, intimis pinnatis, superioribus simplicibus; pinnis superioribus simplicibus oblanceolatis plus minus falcatis 16 cm. longis 4 cm. latis apice acuminatis basi rotundatis sessilibus margine|crenulato-serratis; pinna terminalis basi pinnatifida vel -secta; pinnis infimis pinnatis late triangularibus 25 cm. longis 15 cm. latis, pinnulis utroque latere 1 petiolatis, petiolis 1–2 cm. longis; textura mem-

branacea; pagine supra glabra subtus minute hirsuta. Sori tota pagine dispersi rotundati distincti vel interdum confluentes  $\frac{1}{2}$  mm. in diametro.

HAB. Pachina.

Near *A. Barberi* and *A. melanocaulon*; but differs from the former by the pinnate lower-most pinnae and by the less acuminate pinnules; and from the latter by the less lobed pinnules. Also differs from *A. kwarenkæense* HAY., by the minutely hirsute fronds.

***Aspidium phæocaulon*** ROSENST. l. c. p. 345.

HAB. Urai, 300 m. alt., IV. 1914, FAURIE, n. 33.

***Aspidium rufinerve*** HAYATA (Fig. 67–68). Gen. Ind. p. 102. Rhizoma crassum horizontaliter situm cum reliquis stipitis 4 cm. crassum subrectum dense frondigerum versus apicem dense squamatum. Stipes 90–100 cm. longus nitidus fulvo-rubescens basi pauce squamatus. Frons in ambitu late triangularis 80–90 cm. longa 100



Fig. 67, *Aspidium rufinerve* HAYATA  $\times \frac{1}{2}$



cm. lata apice cuspidato-acuta basi cordata basi tripinnata, pinuis infimis longissimis 50 cm. longis 30 cm. latis oblique triangularibus apice acuminatis bipinnatis, | pinnulis infimis lateris inferioris longissimis lanceolatis 30 cm. longis 10 cm. latis acuminatis basi truncatis pinnatis, pinnulis II. linearibus 6 cm. longis  $1\frac{1}{2}$  cm. latis apice acuminatissimis basi truncatis subsessilibus vel brevissime petiolulatis margine regulariter lobulatis, lobulis oblongis plus minus ascendentibus 5 mm. longis 3–4 mm. latis apice rotundatis; textura membranacea plus minus crassiuscula; pinis inferioribus a se 17 cm., pinnulis I. a se 4 cm., pinnulis II. a se 2 cm., remotis.

HAB. Uraisha, leg. T. SōMA et B. HAYATA, 1916.



Fig. 68, *Aspidium rufinerve* HAYATA.

### *Asplenium* LINN.

***Asplenium pseudofalcatum*** HILLEBR. var. ***subintegrum*** ROSENST. form. ***obtusum*** l. c. p. 334.

HAB. Bunkiko 1500 m. alt., V. 1914, leg. U. FAURIE; ibid. no. 455.

***Asplenium unilaterale*** LAM.; HAYATA Gen. Ind. p. 103.

*Asplenium cataractarum* ROSENST. l. c. 334.

HAB. in monte Tamsui, ad cataractas, 500 m., XII. 1913, leg. U. FAURIE, no. 151.

***Asplenium Wilfordi*** METT. var. ***densum*** ROSENST. l. c. 334.

HAB. ad radices montis Raisha, in petrosis, III. 1914, leg. U. FAURIE, no. 142.

### *Athyrium* ROTH.

***Athyrium tenuissimum*** KODAMA; HAYATA Gen. Ind. p. 110.

*Nephrolepis tenuissima* HAYATA Gen. Ind. p. 110.

*Athyrium obtusifolium* ROSENST. l. c. p. 335.

HAB. in latebris montis Arisan, 2500 m. alt., V. 1914, U. FAURIE, no. 364; *ibid*, in cavernis rupium, no. 360.

*Cyclophorus* DESV.

**Cyclophorus lingua** DESV. var. **angustifrons** HAYATA Gen. Ind. p. 104.

*Cyclophorus lingua* (THBG.) var. *attenuata* ROSENST. l. c.

HAB. Raisha, ad rupes, III. 1914, leg. U. FAURIE, n. 223.

*Diplazium* SW.

**Diplazium Hankockii** (MAXIM.) HAYATA Gen. Ind. p. 105.

*Diplazium crenato-serratum* (BL.) MOORE var. *hirtum* ROSENST. n. v. l. c. p. 336.

HAB. Urai, in silvis 1000 m. alt. IV. 1914, U. FAURIE, no. 168.

**Diplazium kappanense** HAYATA sp. nov. (Fig. 69-70). Rhizoma? Stipes 30-40 cm. longus fulvo-stramineus laud nitidus basi densissime squamatus, (squamis nigerrimis lineari-lanceolatis 10-15 mm. longis 1-2 mm. latis apice acuminatis fere filiformibus ad paginam marginemque hirsutis). Frons in ambitu late triangularis 40 cm. longa 50 cm. lata apice cuspidato-acuminata bipinnata, pinnis infimis longissimis 25 cm. longis 15 cm. latis lanceolatis apice acuminatis basi truncatis, pinnulis lineari-lanceolatis 8 cm. longis 22 mm. latis apice acuminatis basi truncatis subsessilibus margine lobulatis, lobulis denticulatis apice rotundato-truncatis 5 mm. longis totiusque latis; pinnis inferioribus a se 8 cm., pinnulis inferioribus a se 2 cm., remotis; petiolis pinnarum 3 cm. longis, petiolis pinnularum 2 mm. longis; textura herbacea plus minus crassiuscula utraque pagine glabra. Sori lineares 1-1½ mm. longi; indusium lunulatum.

HAB. Kappanzan, leg. U. FAURIE.

Near *Diplazium Dæderleinii*; but distinguishable from it in having black scales.



Fig. 69, *Diplazium kappanense* HAYATA  $\times \frac{1}{4}$

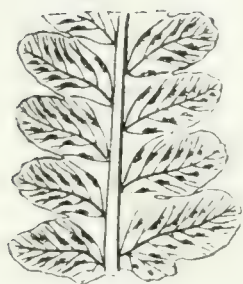


Fig. 70, *Diplazium kappanense*  
HAYATA.

**Diplazium Kawakamii** HAYATA Gen. Ind. p. 106.

*Athyrium allanticarpum* ROSENST. l. c. 335.

HAB. Bunkikiyo, 1500m. alt., V. 1914, leg. U. FAURIE no. 432.



**Diplazium laxifrons** ROSENST. l. c. p. 337.

HAB. Bankinsing, ad cataractas, 800 m. alt., rarissime; II. 1914, leg. U. FAURIE, no. 172.

**Diplazium maximum** (DON.) var. **formosanum** ROSENST. l. c. p. 337.

HAB. in montibus Shinten, I. 1914, U. FAURIE, n. 170.—Urai, in silvis, 800 m. alt., IV. 1914, U. FAURIE, n. 178.

**Diplazium odoratissimum** HAYATA

Gen. Ind. p. 106.

*Diplazium formosanum* ROSENST. l.

c. p. 338.

HAB. Urai, in humidis silvarum, 800 m. alt., IV. 1914, U. FAURIE, no. 188.

**Diplazium pseudo-Dœderleinii**

HAYATA sp. nov. (Fig. 71-72). Stipes 93



Fig. 71, *Diplazium pseudo-Dœderleinii*  
HAYATA  $\times \frac{1}{15}$



Fig. 72, *Diplazium*  
*pseudo-Dœderleinii* HAYATA.

cm. longus pallido-stramineus subnitidus  
basi plus minus rugosus basi dense  
squamosus, squamis fulvis longissime  
linearibus 1-2 cm. longis  $\frac{1}{5}$ -1 mm. latis  
acuminatissimis basi laceratis vel integris.  
Frons late triangularis 169 cm. longa  
138 cm. lata apice triangulari-acuminata  
basi in ambitu sagittato-truncata bipin-  
nata, pinna infima longissima 73 cm.  
longa lanceolata 20-30 cm. lata apice

acuminata basi obtusa, pinnulis lineari-lanceolatis 15 cm. longis 4 cm. latis pinnatifidis, segmentis late linearibus 2 cm. longis 7 mm. latis obtusissimis basi dilatatis serrulatis, serrulis obtusis; pinnis a se 15 cm., pinnulis a se 3–4 cm., segmentis a se 3–4 mm., remotis; textura herbacea; utraque pagine glabra. Sori prope costulam dispositi lineares 3 mm. longi.

HAB. Ushōkō, leg. B. HAYATA, Aprili. 1916, typus!; Arisan, 1912.

Near *D. Dæderleinii*, but differs from it in the far much larger fronds.

**Diplazium uraiense** ROSENST. l. c. 336.

HAB. Urai, in silvis 500 m. alt., IV. 1914, U. FAURIE no. 185.

### *Dryopteris* ADANS.

**Dryopteris adauca** ROSENST. l. c. 341.

HAB. Kelung, secus rivulos, 50 m. alt., III. 1914, FAURIE n. 40.

**Dryopteris aridum** BAK.

The species is confounded with *D. sophoroides* among Formosan specimens. It is separated from *D. sophoroides* in having a series of auriculiformed pinnae towards the base of the fronds.

**Dryopteris atrosetosa** ROSENST. l. c. p. 342.

HAB. Arisan, 2500 m. alt., V. 1914, U. FAURIE, n. 382.

**Dryopteris aureo-vestita** ROSENST. l. c. p. 343.

HAB. Arisan, 2500 m. alt., V. 1914, U. FAURIE, n. 390.

**Dryopteris bankinsinensis** HAYATA sp. nov. (Fig. 73–74). Stipes 40–50 cm. longus minute hirsutus sparse squamatus, squamis tenuissimis ovatis vel lanceolatis  $4\frac{1}{2}$  mm. longis  $2-1\frac{1}{2}$  mm. latis apice cuspidato-acuminatis integris, cellulis linearibus stramineis. Frons bipinnata in ambitu ovato-triangularis 40 cm. longa 30 cm. lata apice acuminata basi truncato-obtusa, pinnis a se 8 cm. remotis inferioribus longioribus 20 cm. longis 7 cm. latis apice acuminatis basi truncatis pinnatis, pinnulis sessilibus a se  $1\frac{1}{2}$  cm. longis oblongo-linearibus 4 cm. longis  $1\frac{1}{2}$  cm. latis margine lobulatis, lobulis truncatis; textura membranacea herbacea. Sori lineares 1–2 mm. longi. Indusium nullum.

HAB. Bankinsin, leg. U. FAURIE (No. 183).

Near *D. decurrenti-alata* HOOK.; but differs from it by the much thinner fronds with more obtuse lobes and pinnules.



**Dryopteris erythrosora** (EAT.) var. **tenuipes** ROSENST.

l. c. p. 341.

HAB. Mai, 800 m. IV. 1914, leg. U. FAURIE, no. 63.

**Dryopteris fluvialis** HAYATA Gen. Ind. p. 107.

*Dryopteris athyriiformis* ROSENST. l. c. p. 344.

HAB. Bankinsing, in silvis, 600 m. alt., II. 1914, leg.



Fig. 74,  
*Dryopteris bankin-*  
*sinense* HAYATA.



Fig. 73, *Dryopteris bankinsinensis* HAYATA  $\times \frac{1}{3}$



FAURIE, n. 189. Bunkikiyo, in humidis, 2000m. alt., V. 1914, leg. FAURIE, n. 386.

**Dryopteris gymnopteridifrons** HAYATA sp. nov. (Fig. 75-76), Rhizoma? Stipes circ. 30-40 cm. longus stramineus.

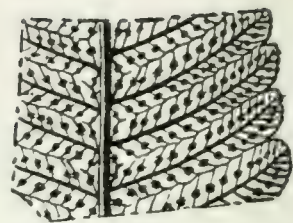


Fig. 76, *Dryopteris gymnopteridifrons* HAYATA.



Fig. 675, *Dryopteris gymnopteridifrons* HAYATA  $\times \frac{1}{4}$

Frons in ambitu ovato-triangularis 40–50 cm. longa 40 cm. lata pinnata; pinnis omnibus subæqualibus conformibus utroque latere 3–4 ascendentibus vel patentibus lineari-lanceolatis 20–25 cm. longis 4–5 cm. latis apice acuminatissimis basi obtusis margine crenato-serratis utraque pagine minute hirsutis; textura membranaceo-chartacea. Sori inter venas pinnarum 2-seriatim in lineis parallelis a costa usque ad marginem dispositi rotundati 1 mm. in diametro.

HAB. Kusukusu, leg. T. SŌMA, 1912.

Somewhat resembles *Nephrodium cuspidatum* BLUME (BLUME t. 45) and *Dryopteris urophylla* (WALL.) C. CH.; but differs from them in pinnæ which are in our species more obtuse or rather truncate at the base.

***Dryopteris latipinna* HOOK.**

*Dryopteris sophoroides* O. K. form. *ensiformis* HAYATA Ic. Pl. Formos. VI. p. 180, fig. 118.

***Dryopteris splendens* (HOOK.) var. *formosana* ROSENST. l. c. 343.**

HAB. Arisan, 2500 m. alt., V. 1914, leg. U. FAURIE, n. 381.

***Dryopteris subhispidula* ROSENST. l. c. p. 343.**

HAB. Shakko, XII. 1913, leg. U. FAURIE n. 12.

***Dryopteris sublaxa* HAYATA Gen. Ind. p. 108.**

*Dryopteris arisanensis* ROSENST. l. c. p. 340.

HAB. in monte Arisan, 2500 m. alt., V. 1914, U. FAURIE, no. 389.

***Dryopteris subtripinnata* (MIQ.) var. *bunkikiyensis* ROSENST. l. c. p. 342.**

HAB. Bunkikiyo, 2000 m. alt., V. 1914, U. FAURIE, n. 393.

***Dryopteris succulentipes* HAYATA sp. nov.** (Fig. 77–78). Stipes 30–40 cm. longus succulentus minute hirsutus basi squamatus, (squamis ovatis vel lanceolatis tenuissimis stramineis 5 mm. longis  $1\frac{1}{2}$  mm. latis apice caudato—acuminatissimis integris. Frons ovato-lanceolata 40 cm. longa 20 cm. lata apice triangulari-acuminata basi obtusa pinnata, pinnis a se 8 cm. remotis, mediis longissimis linearibus 15 cm. longis 3 cm. latis apice acuminatis basi truncatis pinnati-sectis inferiore circ. ad rhachin sectis, segmentis linearibus 2 cm. longis 8 mm. latis apice obtuso-truncatis basi haud contractis margine





Fig. 77, *Dryopteris succulentipes* HAYATA  $\times \frac{1}{3}$

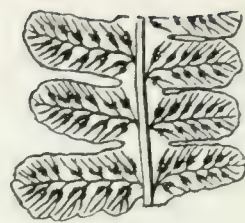


Fig. 78, *Dryopteris succulentipes* HAYATA.

crenulato-serrulatis; textura herbacea membranacea. Sori lineares 1 mm. longi. Indusium nullum.

HAB. Arisan, leg. U. FAURIE.

Near *D. decurrenti-alata* Hook., but differs from it by the truncate segments of the pinnae.

***Dryopteris uraiensis***

ROSENST. l. c. p. 341.

HAB. Urai, 500 m. alt., IV. 1914, U. FAURIE, n. 22.

***Elaphoglossum* SCHOTT.**

***Elaphoglossum subelipticum*** ROSENST. l. c. p. 348.

HAB. Bunkikiyo, 1500 m. alt., V. 1914, leg. U. FAURIE, n. 488.

***Leptochilus* KAUL.**

***Leptochilus cuspidatus* (Pr.) var. *crenatus*** ROSENST. l. c. p. 348.

HAB. Bankinsing, 800 m. alt., II, 1914, leg. U. FAURIE. n. 281.



*Plagiogyria* KUNZE.

***Plagiogyria rankanensis*** HAYATA sp. nov. (Fig. 79-80). Rhizoma erectum plus minus ascendens. Stipes 13-14 cm. longus triangularis in sectione basi dilatatus subcomplanatus basi plus minus squamatus. Frons sterilis lineari-triangularis 30 cm. longa 18 cm. lata apice in ambitu cuspidata basi truncata pinnata, pinnis inferioribus



Fig. 79, *Plagiogyria rankanensis*  
HAYATA.



Fig. 80, *Plagiogyria rankanensis* HAYATA  $\times \frac{1}{4}$

longioribus, infimis plus minus reflexis, inferioribus horizontaliter patentibus lineari-lanceolatis 9 cm. longis 12 mm. latis apice acuminatis ad summum obtusis basi lateris inferioris valde contractis sed basi lateris superioris ad

rhachin frondis decurrentibus margine minute denticulatis sursum ad acuminem serrulatis; textura tenuiter chartacea, rhachis frondis complanata anguste alata. Frons fertilis 30–40 cm. longa remote pinnata, pinnis linearibus crispato-recurvatis 5–10 cm. longis 1 mm latis.

HAB. Rankanzan, ad 4900 ped. alt., leg. B. HAYATA, Mai. 1916.

Near *P. adnata* BEDD., but separable from it by the distinctly winged rhachis and much smaller terminal pinna.

***Polypodium* LINN.**

***Polypodium diversum* ROSENST. l. c. 347.**

HAB. Raisha, in arboribus serpens, 1000 m. alt., III. 1914, FAURIE, n. 202.

***Polypodium hoozanense* HAYATA sp. nov.** (Fig. 81–82). Rhizoma repens teres dense frondigerum apice dense squamatum. Stipes 2–3 cm. longus stramineus. Frons late linearis 15–20 cm. longa 2–3 cm. lata apice acuta vel obtusa basi longe attenuata ad stipitem decurrens margine integra vel plus minus undulata; textura crassiuscula supra viridis subtus pallidissima. Sori utroque latere costæ 1-seriatim prope costam dispositi rotundati 3–4 mm. in diametro a se 5–6 mm. distantes.



Fig. 81, *Polypodium hoozanense*  
HAYATA.

HAB. Hoozan, prope Keitao, ad 5000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *P. infraplanicostale* HAYATA, but differs from it in having quite obtuse fronds with much larger sori.

***Polypodium Kawakamii* HAYATA**  
Gen. Ind. p. 111.

*Polypodium arisanense* ROSENST. l.c.  
p. 347.

HAB. Arisan, ad arborum truncos, 2500 m. alt., V. 1914, U. FAURIE, n. 472.

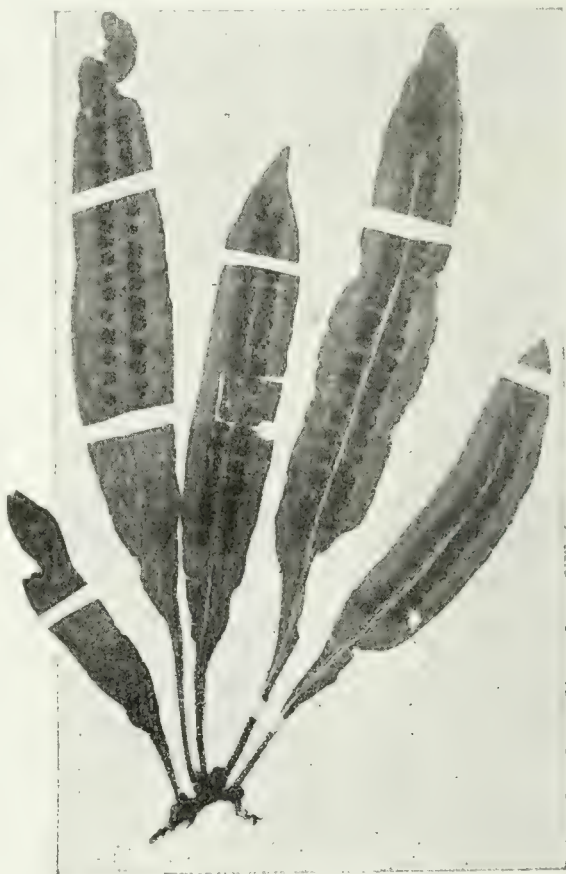


Fig. 82, *Polypodium hoozanense*  
HAYATA  $\times \frac{1}{3}$



**Polypodium Morii** HAYATA sp. nov. (Fig. 83-84). Rhizoma repens dense frondigerum dense squamatum. Stipes 4-8 cm. longus fulvo-rubescens basi plus minus squamatus. Frons lanceolata 25 cm. longa 3 cm. lata apice acuminatissima basi gradatim attenuata ad stipitem decurrens margine integra; textura chartacea in exsiccatō fulvo-rubescens utraque pagine glabra. Sori utraque pagine 1-seriatim dispositi a costa

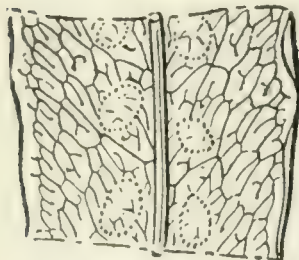


Fig. 83, *Polypodium Morii* HAYATA.

3-4 mm. a margine 10 mm. remoti rotundati 4-5 mm. in diametro a se 7-8 mm. remoti.

HAB. Toroku, Washakei, leg. U. MORI, 1908.

Near *P. infraplanicostale* HAY.; but differs from it in having much larger fronds of thinner texture and in the larger sori.

**Polypodium megasorum** C. CH.; HAYATA Gen. Ind. p. 112.

*Polypodium raishaense* ROSENST. l. c. p. 346.

HAB. Raisha, ad arborum truncos, 1200 m. alt., III. 1914, U. FAURIE, n. 219.—Bunki-kiyo, 1500 m. alt., V. 1914, n. 481.

**Polypodium pseudotrichomanoides** HAYATA Gen. Ind. p. 112.

*Polypodium pseudocucullatum* ROSENST. l. c. p. 345.

HAB. in monte Arisan, 2500 m. alt., inter muscos, rarum, V. 1914, U. FAURIE, n. 471.

**Polypodium remote-frondigerum** HAYATA Gen. Ind. p. 112.

*Polypodium loxogramme* METT. var. *lamprocaulon* ROSENST. l. c. p. 347.

HAB. Arisan, 2500 m. alt., ad arbores, V. 1914, U. FAURIE, n. 464.



Fig. 84, *Polypodium Morii* HAYATA  $\times \frac{1}{3}$



**Polypodium shintenense** HAYATA sp. nov. (Fig. 85-86). Rhizoma repens teres 5 mm. in diametro remote frondigerum adpresse squamatum. Stipes 25-30 cm. longus stramineus glaber nitidus erectus basi sparse squamatus. Frons simplex vel basi pinnati-loba; frondibus simplicibus lanceolatis 40-50 cm. longis 5-6 cm. latis apice acuminatis basi attenuato-decurrentibus margine

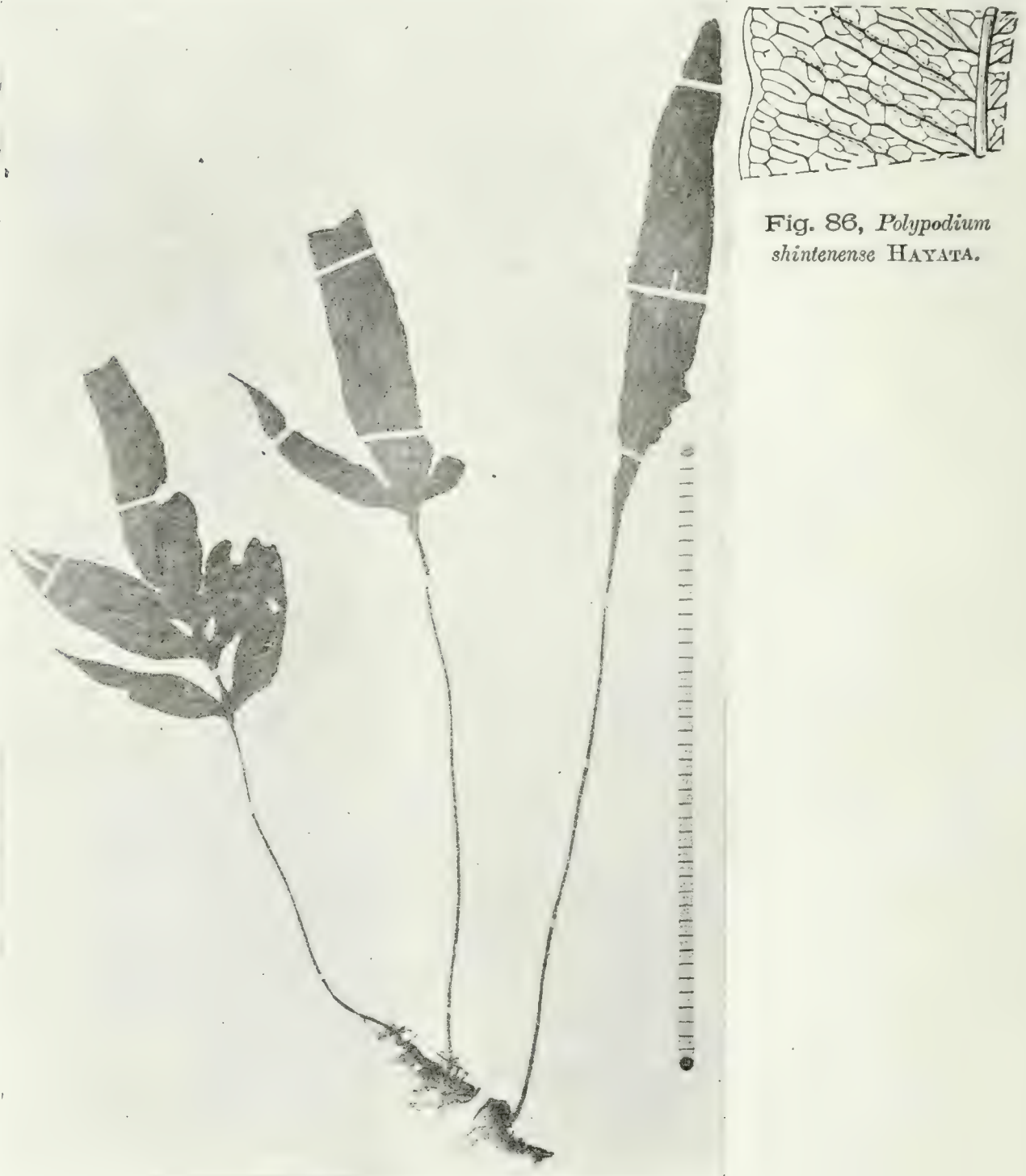


Fig. 86, *Polypodium shintenense* HAYATA.

Fig. 85, *Polypodium shintenense* HAYATA  $\times \frac{1}{5}$

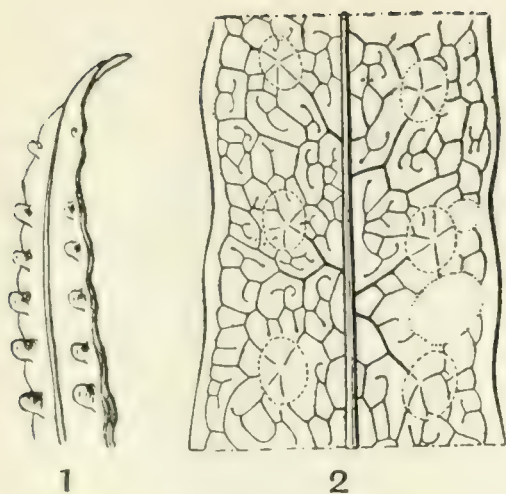


Fig. 87, *Polypodium suishastagnale* HAYATA; 1. an apical portion of a pinna; 2, a portion of a frond.

subintegris vel obscure crenatis versus basin plus minus lobulatis; frondibus pinnatilobatis in ambitu ovatis, lobis vel segmentis inferioribus lanceolatis acuminatis basi ad rhachin decurrentibus margine subintegris. Sori utroque latere costæ 1-seriatim dispositi lineares  $2\frac{1}{2}$  cm. longi a costa 2 mm. a margine 3-4 mm. distantes a se 7 mm. remoti.

*Polypodium Wrightii* (Hk.) var. *lobatum*

ROSENST. in Hedwigia Band 56, p. 347.

HAB. Shinten, leg. U. FAURIE, Juli. 1914, No. 215.

Near *P. Wrightii*; but differs from it in the much larger fronds which are more or less lobulate-pinnatifid towards the base.

It is regarded by ROSENSTOCK as a variety of *P. Wrightii*. But, as can be seen from the thinner texture, much larger lobulate form and different structure of the scales, it differs specifically from *P. Wrightii*, whose frond is of thicker texture, much maller and never lobate.

***Polypodium suishastagnale* HAYATA** (Fig. 87-88) Gen. Ind. p. 113.

HAB. Suisha, leg. B. HAYATA, Aprili. 1916.

***Polystichum* ROTH. pt.**

***Polystichum arisanicum* ROSENST. l. c. 339.**

HAB. in monte Arisan, 2500 m. alt., V. 1914, U. FAURIE, n. 366.

***Polystichum obtuso-auriculatum* HAYATA** Gen. Ind. p. 113.



Fig. 88, *Polypodium suishastagnale* HAYATA  $\times \frac{1}{8}$

*Polystichum formosanum* ROSENST. l.c. 338.

HAB. Bunkikiyo, in rupibus, 2500 m. alt., V. 1914, FAURIE, n. 363.

**Polystichum prionolepis** HAYATA Gen. Ind. 114.

*Polystichum lentum* (DON.) MOORE var. **gelida** ROSENST. l.c. 339.

HAB. in monte Arisan, 2500 m. alt., V. 1914, U. FAURIE, n. 363.

**Polystichum varium** (L.) var. **eurylepidota** ROSENST. in Hedwigia Band 56, p. 340.

*Pteris* LINN.

**Pteris quadriaurita** RETZ. var. **abbreviata** ROSENST. l.c. 333.

Kelung, in rupibus littoris, III. 1914, FAURIE, n. 122.

*Woodwardia* SMITH.

**Woodwardia orientalis** SW. var. **formosana** ROSENST. l.c. 334.

HAB. Bankinsing, ad cataractas, II. 1914, U. FAURIE, n. 231.

Lycopodiaceæ.

*Lycopodium* LINN.

**Lycopodium tereticaule** HAYATA Gen. Ind. p. 117.

*Lycopodium Fauriei* ROSENST. l.c. p. 348.

HAB. Arisan ex arboribus dependens, 2500 m. alt., V. 1914, U. FAURIE, n. 492.



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ICONES PLANTARUM FORMOSANARUM.

VIII.

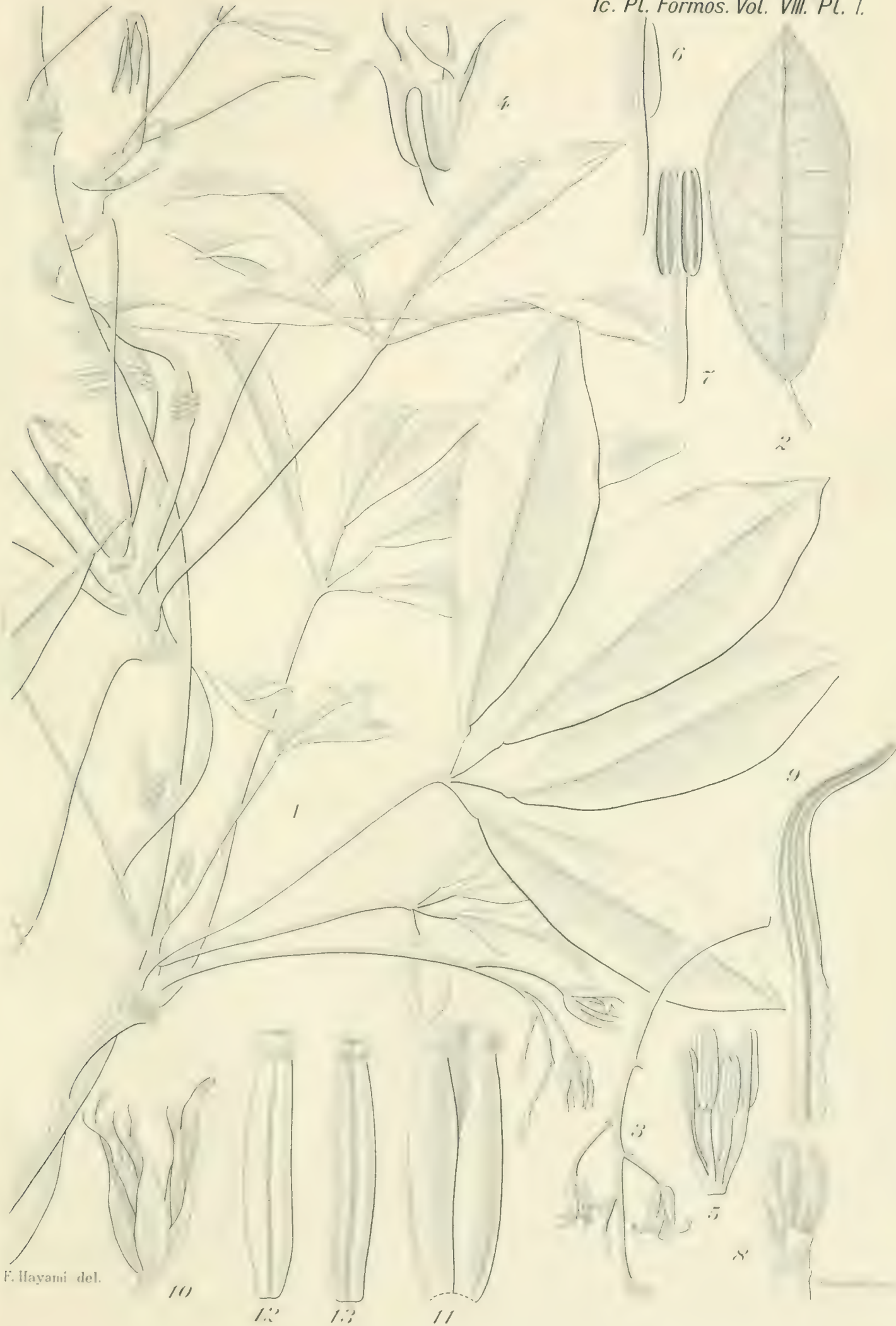
PLATE I.



## Explanation of Pl. I.

*Stauntonia formosana* HAYATA.

- Fig. 1. A branch.  
2. A leaflet.  
3. A male raceme.  
4. A male flower.  
5. Stamens.  
6, 7. A stamen seen from different sides.  
8. A rudimentary ovary.  
9. A petal.  
10. A female flower.  
11. Carpels.  
12, 13. A carpel, seen from different sides.



F. Hayami del.





ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE II.

## Explanation of Pl. II.

*Camellia nokoensis* HAYATA.

- Fig. 1. A branch.  
2. A flower.  
3. A petal.  
4, 5, 6. A stamen, seen from different sides.  
7. An ovary with the style.  
8. Basal portion of the same, in vertical section.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE III.

### Explanation of Pl. III.

*Trigonatis elevato-venosa* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. Corolla, expanded.  
5. Stamens.  
6. A fruit.  
7. An achene.





### Explanation of Pl. IV.

*Vernonia Kawakamii* HAYATA.

- Fig. 1. The plant.  
2. A leaf, seen from above.  
3. The same, seen from below.  
4. A head.  
5. A flower.  
6, 7. A stamen, seen from different sides.  
8. The style.  
9. A pappus-hair.  
10. A achene.  
11. Cross section of the same.  
12. A portion of the receptacle.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE V.

## Explanation of Pl. V.

*Eupatorium gracillimum* HAYATA.

- Fig. 1. A branch.  
2. A head.  
3. A flower.  
4. Corolla.  
5. An apical portion of the same corolla.  
6. Stamens.  
7. A style with the basal stylopodium.  
8. A achene.  
9. A pappus-hair.





F. Hayami del.

Yamanaka sculp



ICONES PLANTARUM FORMOSANARUM.

VIII.

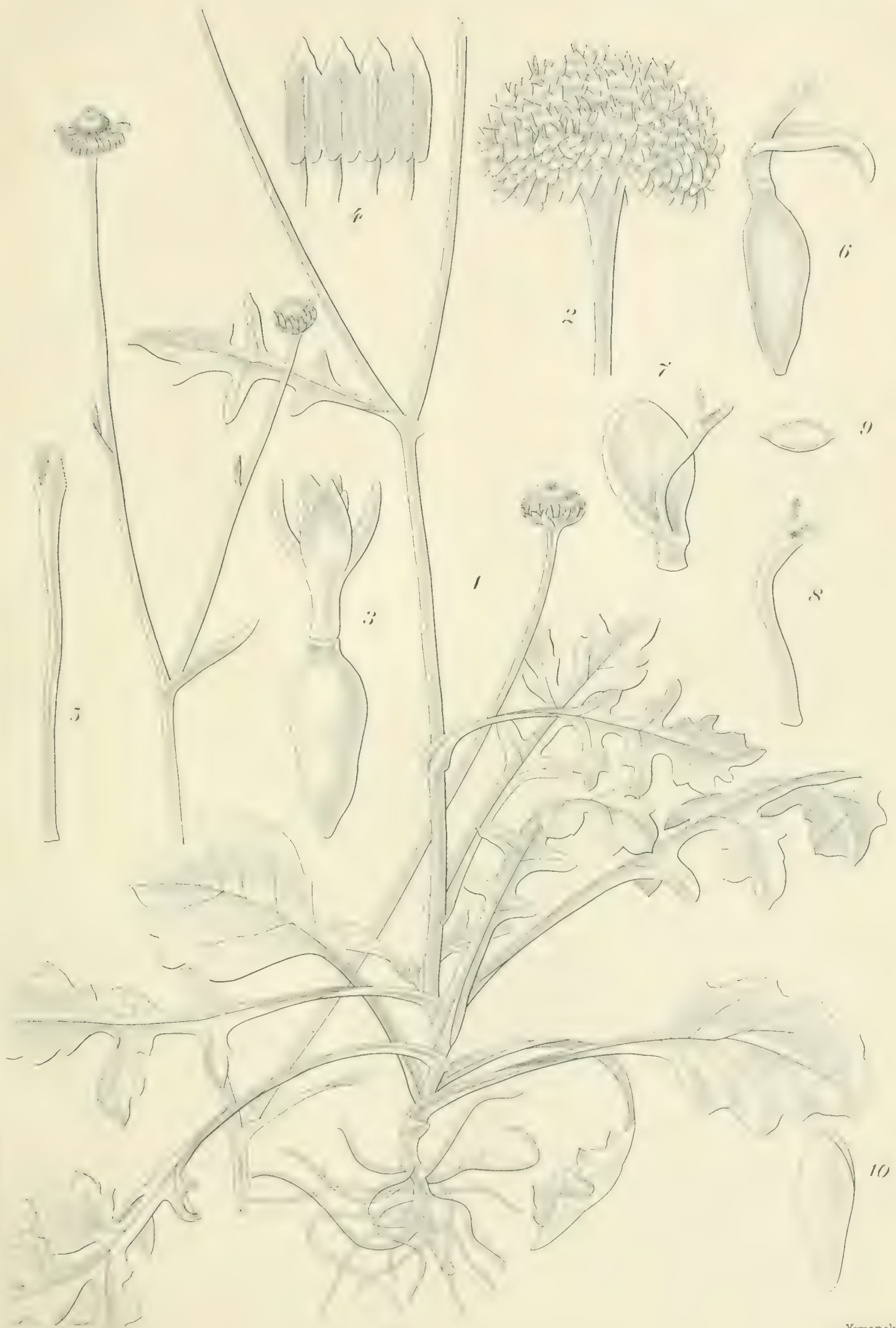
PLATE VI.



## Explanation of Pl. VI.

*Myriactis longipedunculata* HAYATA.

- Fig. 1. The plant.  
2. A head.  
3. A disc-flower.  
4. Stamens.  
5. The style of a disc-flower.  
6. A marginal flower.  
7. The corolla and style of the same.  
8. The style of the same.  
9. Cross section of an achene.  
10. An embryo.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE VII.

## Explanation of Pl. VII.

*Sphaeranthus suberiflorus* HAYATA.

- Fig. 1. The plant.  
2. Compound head.  
3. Vertical section of the same.  
4. A single head.  
5. A female flower.  
6. A bisexual flower.  
7. Stamens.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE VIII.

### **Explanation of Pl. VIII.**

*Artemisia Somai* HAYATA.

- Fig. 1. The plant.  
2. A disc-flower.  
3. Stamens.  
4. The style and ovary of a disc flower.  
5. A female flower.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE IX.



### Explanation of Pl. IX.

*Artemisia Kawakamii* HAYATA.

- Fig. 1. The plant.  
2. A disc-flower.  
3. Stamens seen from within.  
4. A stamens, seen from without.  
5. The style of a disc-flower.  
6. A female flower.  
7. An apical portion of the corolla of a female flower.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE X.

## Explanation of Pl. X.

*Ainsliea secundiflora* HAYATA.

- Fig. 1. The plant.  
2. A head.  
3. An outer scale.  
4. An inner scale.  
5. A flower.  
6. Corolla, expanded.  
7. Stamens.  
8. A style with the basal stylopodium.  
9. A pappus-hair.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE XI.

## Explanation of Pl. XI.

*Ainsliea asarifolia* HAYATA.

- Fig. 1. The plant.  
2. A head.  
3, 4. Outer and inner scales.  
5. A flower, ovary taken off.  
6. Corolla of the same flower, expanded.  
7. Stamens.  
8. The style.  
9. An achene.  
10. The same in section.  
11. A seed.  
12. A pappus-hair.





F. Hayami del.

Yamanaka sculp.



ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE XII.



## Explanation of Pl. XII.

*Lamium kelungense* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. Corolla, expanded.  
5, 6. Stamens seen from different sides.  
7. An ovary and style.  
8, 9. Achenes, seen from different sides.



F. Hayami del.

Yamanaka sculp.





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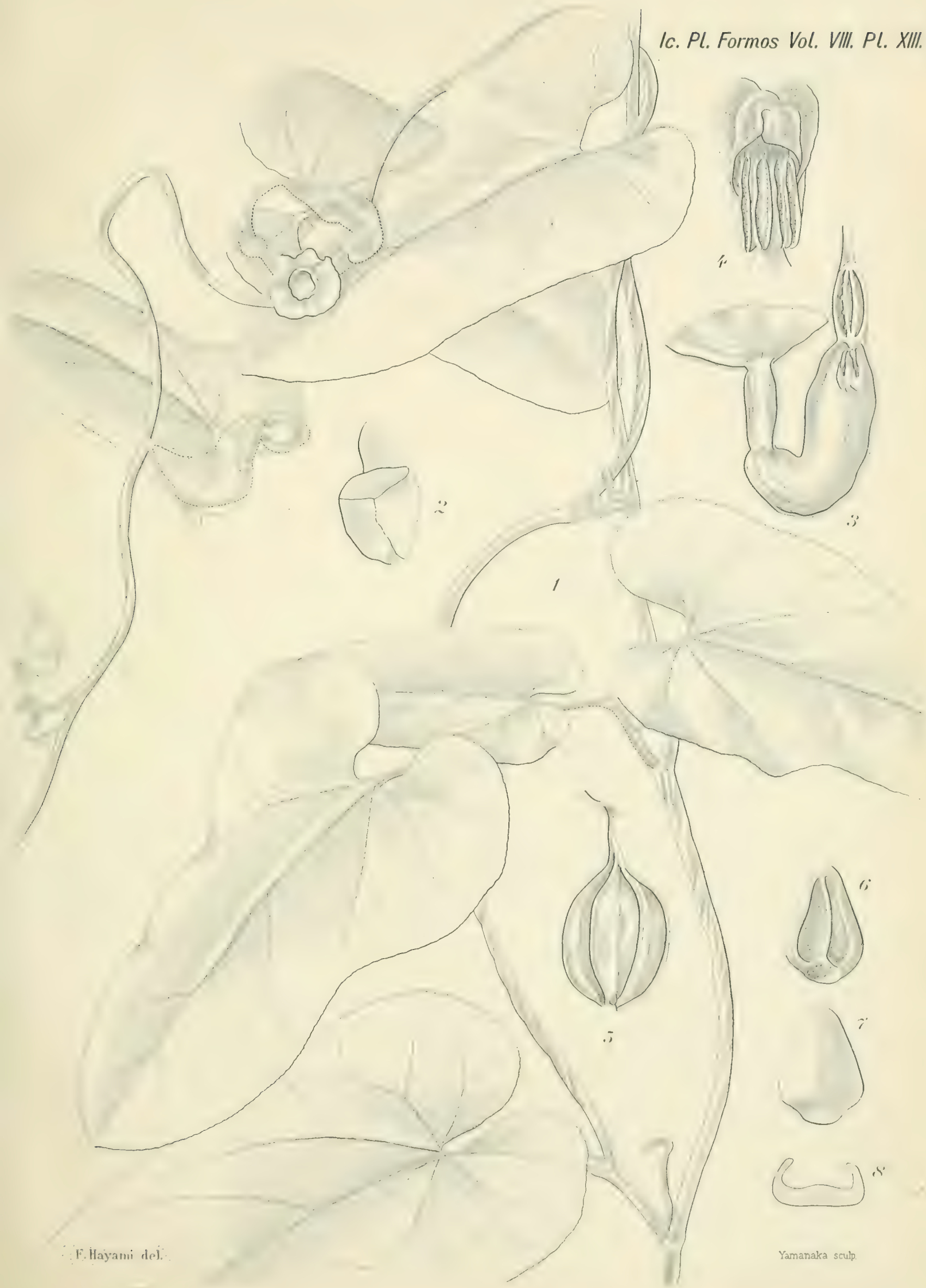
VIII.

PLATE XIII.

### Explanation of Pl. XIII.

*Aristolochia Shimadai* HAYATA.

- Fig. 1. The plant.
2. Apical portion of a flower, before opening.
3. A mature flower, in vertical section.
4. Stamens and style.
5. A fruit.
- 6, 7. Seeds, seen from different sides.
8. Section of a seed.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE XIV.

**Explanation of Pl. XIV.**

*Ficus tannoensis* HAYATA.

(Analysis in the text.)

- Fig. 1. A branch of *F. tannoensis* HAYATA form. *rhombifolia*.  
2. A branch of *F. tannoensis* HAYATA form. *angustifolia*.







ICONES PLANTARUM FORMOSANARUM.

VIII.

PLATE XV.



**Explanation of Pl. XV.**

*Ficus terasoensis* HAYATA.

(Analysis in the text.)







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7

# ICONES PLANTARUM FORMOSANARUM

NEC NON ET

CONTRIBUTIONES AD FLORAM  
FORMOSANAM

IX.

---

AUCTORE

Bunzō Hayata





TO HIS EXCELLENCY BARON KENJIRO DEN,

GOVERNOR GENERAL OF FORMOSA.

SIR,

I have the honour to submit to your Excellency the ninth volume of the *Icones Plantarum Formosandarum, nec non et Contributiones ad Floram Formosanam* by BUNZŌ HAYATA, D. Sc.

HIROSHI SHIMOMURA,

CIVIL GOVERNOR OF FORMOSA.

November 1, 1919, Taihoku.





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## INTRODUCTION.

---

The present volume contains studies on species and varieties ranging from the Ranunculaceæ down to the Aroideæ. All the species of Phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER. Of the species and varieties mentioned in this work, 139 are proposed as new species and 4 are regarded as new varieties of known species. Two new genera *Dolichorigna* and *Pseudosmilax* are proposed as new, while nine genera are mentioned as new to the flora of the island. The latter genera are as follows:—

<i>Reevesia</i>	<i>Anotis</i>	<i>Agynenia</i>
<i>Phellodendron</i>	<i>Mimulus</i>	<i>Alchornea</i>
<i>Filipendula</i>	<i>Siphonostegia</i>	<i>Orchis</i>

Thus, up to the present date, the total number of species of the flora, so far as is known, is 3,608 and 78 varieties belonging to 1,185 genera and 169 families.

Finally, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa, to whom I am much indebted for help in the collection of material and in the publication of this work.

BUNZŌ HAYATA.

October 1919, Taihoku and Tōkyō.





## Contributions to the Flora of Formosa.

### VII.

#### Ranunculaceæ.

##### *Clematis* LINN.

*Clematis garanbiensis* HAYATA sp. nov. Scandens et volubilis. Caulis teres multistriatus glaber. Folia opposita membranacea vel tenuiter chartacea ovata 4 cm. longa  $2\frac{1}{2}$  cm. lata apice obtusa sed ad summum breve cuspidato-apiculata basi late rotundata ad extremitatem acuta palmatim 5-nervia utraque pagina plus minus hirsuta, petiolis 3 cm. longis hirsutis. Panicula late cymosa cum pedunculo 9 cm. longa 10 cm. lata hirsuta, bracteis spathulatis 1–3 cm. longis, pedicellis ultimis 2 cm. longis. Sepala 4 lanceolata 13 mm. longa 4 mm. lata apice acuta basi gradatim contracta extus villosa intus glabra. Stamina  $\infty$ , filamentis glabris filiformibus complanatis 3–10 mm. longis, antheris linearibus  $3\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice apiculatis basi obtusis. Carpella 6–8, basi fusiformia cum stylis 7 mm. longa dense longeque sericeo-pilosa.

HAB. Garanbi, leg. T. KAWAKAMI, Juli. 1906.

Near *Clematis paniculata* THUNB.; but differs from it in having triangular ovate leaves. This is perhaps identical with a Chinese specimen labelled *C. paniculata* preserved in the herbarium of Kew, which I had an opportunity to look at, when I was there.

#### Magnoliaceæ.

##### *Illicium* LINN.

*Illicium arborescens* HAYATA (Fig. 1) Ic. Pl. Formos. II. p. 106. Descriptio aucta:—Carpella circ. 12 fere distincta maturitate crasse coriacea fere lignosa  $1\frac{1}{2}$  cm. longa horizontaliter patentia. Semina nitida valde complanata 9 mm. longa 5–6 mm. lata.

HAB. Tōzan, Arisan.

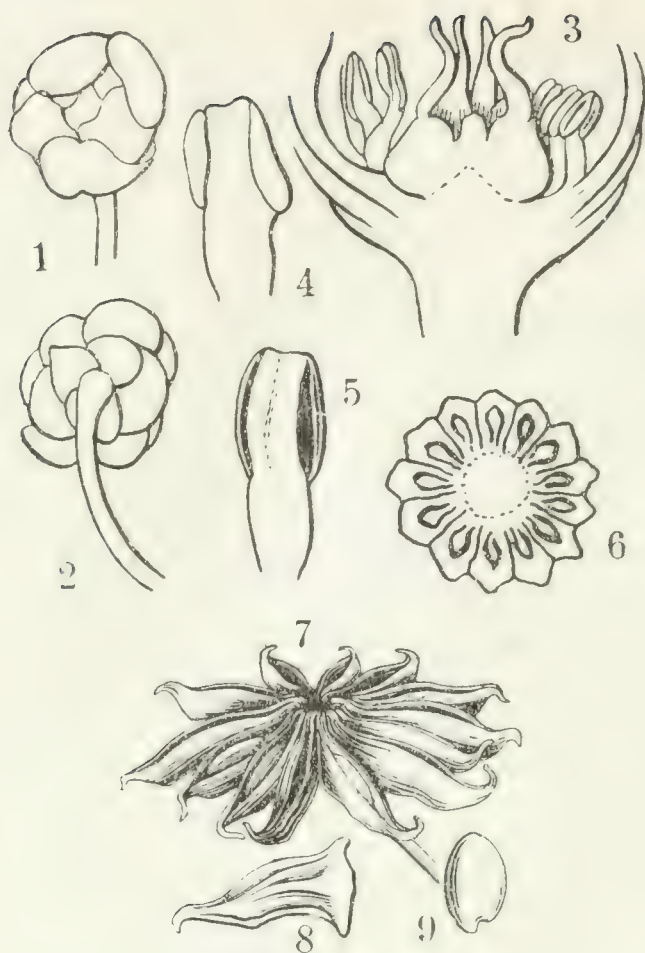


FIG. 1; *Illicium arborescens* HAYATA; 1, 2, flowers; 3, vertical section of the genital part of a flower; 4, 5, a stamen, seen from different sides; 6, cross section of carpels; 7, a fruit; 8, a carpel; 9, a seed.

***Illicium leucanthum* HAYATA** sp. nov. (Fig. 2). Frutex vel arborescens, ramulis fusco-cinerascentibus. Folia oblongo-lanceolata 8–10 cm. longa  $2\frac{1}{2}$ –4 cm. lata apice acuminata basi acuta integra coriacea, petiolis 1 cm. longis. Flores subalbi terminales vel axillares solitarii, bracteis basi floris multiserialiter dispositis, inferioribus brevioribus rotundatis latioribus 2–10 mm. longis alabastrum floris amplectantibus margine ciliolatis, pedicellis 1 cm. longis. Sepala alba 13–15, exteriora plus minus latiora obovato-spathulata 8–9 mm. longa 6 mm. lata margine ciliolata, interiora angustiora linearia  $1\frac{1}{2}$  cm. longa 3 mm. lata apice obtusa, intima angustissima linearia 12 mm. longa 2 mm. lata apice acuta.

Stamina circ. 20, filamentis incrassatis 2 mm. longis 1 mm. latis, antheris adnatis oblongis  $1\frac{1}{2}$  mm. longis obtusis. Carpella 8 fere distincta  $4\frac{1}{2}$  mm. longa latere complanata.

*Illicium anisatum* L. var. *leucanthum* HAYATA Gen. Ind. p. 2.

HAB. Arisan: Mingetsu, leg. B. HAYATA ad 7000 ped. alt. Aprili. 1916.

Near *Illicium anisatum*, but differs from it in the white flowers with larger stamens and less curved carpels.

NOTE: Outer sepals reddish; inner ones white or yellowish white.

***Illicium randaiense* HAYATA** sp. nov. (Fig. 3). Frutex vel arborescens, ramulis fusco-cinerascentibus glabris. Folia versus apicem ramorum approximativim disposita oblongo-ovata vel -obovata coriacea vel chartacea 8 cm. longa 3 cm. lata apice breve acuta ad summum obtusa basi acuta vel obtusa integra,



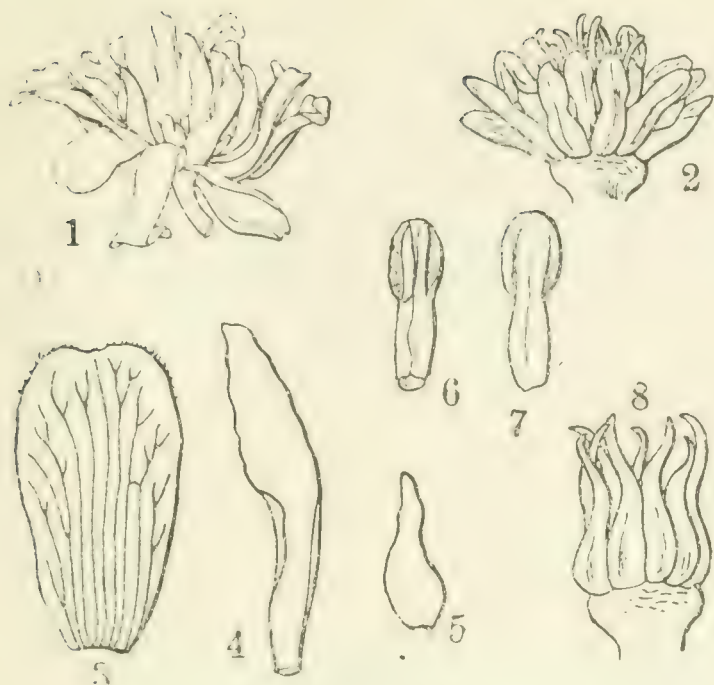


Fig. 2; *Illicium leucanthum* HAYATA; 1, a flower; 2, genital portion of a flower; 3, 4, 5, an outer, inner, innermost, segment; 6, 7, a stamen, seen from different sides; 8, carpels.

petiolis 5–10 mm. longis. Flores axillares solitarii, pedicellis circ. 1 cm. longis, bracteis basi pedicelli multi-seriatim dispositis, inferioribus latioribus rotundatis, superioribus plus minus longioribus, margine ciliolatis apice rotundatis breve vix vel haud apiculatis. Sepala 12–15, exteriora minora latiora late oblonga 8 mm. longa totiusque lata apice rotundata truncata, interiora oblongo-linearia 12 mm. longa 5 mm. lata, intima

linearia 12 mm. longa 3 mm. lata, margine ciliolata. Stamina circ. 20, filamentis incrassatis  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis, antheris oblongis 1 mm. longis

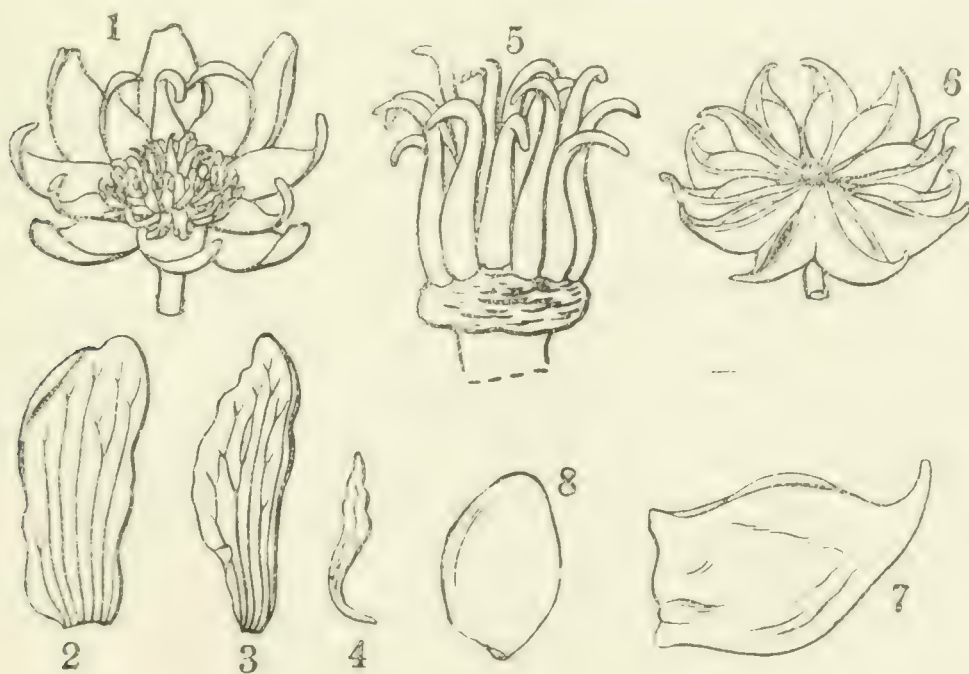


Fig. 3; *Illicium randuense* HAYATA; 1, a flower; 2, 3, 4, an outer, inner, innermost, segment; 5, carpels; 6, a fruit; 7, a follicle; 8, a seed.

$\frac{2}{3}$  mm. latis apice obtusis. Carpella circ. 12, fere distincta basi 1 mm. lata cum stylis 3 mm. longa, maturitate ovata, partibus ovatis 1 cm. longis 8 mm. latis valde complanatis apice caudata, caudis recurvatis.

*Illicium anisatum* HAYATA Gen. Ind. p. 2 (non LINN.)

HAB. Randaisan, Manapan, leg. B. HAYATA et U. MORI, Aug. 1903.

Near *Illicium Tashiroi* MAXIM.; but differs from it in the free carpels.

### *Schizandra* MICHX.

**Schizandra arisanensis** HAYATA Ic. Pl. Formos. V. p. 1. Descriptio aucta:—Syncarpium elongatum 10–15 cm. longum; baccis globosis 8 mm. in diametro 2-spermis, seminibus globoso-reniformibus 4 mm. latis  $3\frac{1}{2}$  mm. longis muricatis; testa crustacea, albuminibus carnosus.

HAB. Ritōzan, leg. Y. MATSUDA, Aug. 1918, No. 336.

### *Kadsura* JUSS.

**Kadsura Matsudai** HAYATA sp. nov. Scandentissima, rami et ramuli graciles fusco-purpureo-rubescens. Folia alterna lanceolata 9–10 cm. longa  $2\frac{1}{2}$  cm. lata apice obtusissima basi acuto-obtusa chartacea utraque pagina glabra margine subintegra, petiolis  $1\frac{1}{2}$ –2 cm. longis. Flores ♂ axillares solitarii pedunculati, pedunculis  $1\frac{1}{2}$  cm. longis glabris. Segmenta 12, exteriora minora triangularia ovata oblonga 1 mm.–5 mm. longa 2–3 mm. lata, interiora majora lineari-oblonga 1 cm. longa  $4\frac{1}{2}$  mm. lata apice rotundata basi contracta margine sursum minute ciliolata, intima minora. Fasciculi staminales globosi 7 mm. in diametro, antheris sessilibus se toto connatis, loculis obovatis  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis. Fl. ♀: ignoti. Syncarpium globosum axillare solitarium, pedunculis  $1\frac{1}{2}$ –5 cm. longis glabris; syncarpium 2–3 cm. in diametro, baccis subglobosis 1 cm. longis glabris rubris 2-spermis; seminibus reniformibus  $3\frac{1}{2}$  mm. longis  $4\frac{1}{2}$  mm. latis plus minus complanatis, albuminibus carnosus.

HAB. Ariko, leg. Y. MATSUDA, Jan. 1917.

Near *Sch. arisanensis* HAY.; but differs from it in the lanceolate and obtuse leaves.

## Berberideæ.

*Mahonia* NUTT.

*Mahonia lomariifolia* TAKEDA. Contributions to the Knowledge of the Old World Species of the Genus *Mahonia* in Notes from the Royal Botanic Garden, Edinburgh, Vol. VI. p. 231.

*Mahonia morrisonensis* TAKEDA l. c. p. 239.

## Ternstroemiaceæ.

*Eurya* THUNB.

*Eurya leptophylla* HAYATA sp. nov. (Fig. 4). Frutex. Rami et ramuli gracillimi apice fulvo-hirsuti. Folia alterna oblonga vel oblongo-lanceolata 3–3½ cm. longa 1–1½ cm. lata apice acuminata vel acuta sed ad summum semper obtusa basi acuta margine crenulato-serrulata utraque pagine subglabra, costa supra impressa

subtus elevata, venis venulisque utraque pagine tenuiter elevatis, petiolis 1–2 mm. longis tenuiter subalatis. Flores ad axillas fasciculati, pedicellis 2 mm. longis subglabris apice infra calycem bracteolis duabus instructis. Fl. ♂: majores

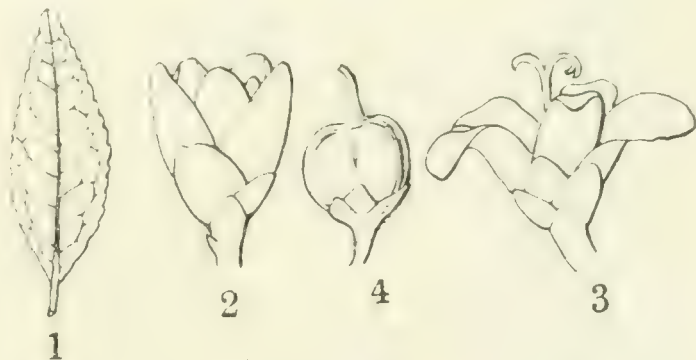


Fig. 4; *Eurya leptophylla* HAYATA; 1, a leaf; 2, a male flower; 3, a female flower; 4, an immature fruit.

quam fl. ♀; sepala rotundata 5 in magnitudine inæqualia, majora 2 mm. in diametro concava glabra basi plus minus connata. Petala 5 rotundato-oblonga 3 mm. longa 2 mm. lata concava apice rotundata subrotato-semiclausa glabra imbricata integra. Stamina 7–8 basi petali affixa, filamentis glabris filiformibus 2–2½ mm. longis, antheris ovato-oblongis 1 mm. longis ½ mm. latis apice apiculatis basi 2-lobatis glabris; rudimentum ovarii nullum. Fl. ♀: quam fl. ♂ minores campanulato-patentes 2½ mm. longi; sepala inæqualia oblonga vel ovata 1–1½ mm. longa dorso plus minus hirsuta apice rotundata vel acuta; petala 5 glabra inæqualia oblongo-linearia vel oblonga 2 mm. longa



$\frac{1}{2}$ –1 mm. lata apice acuta vel obtusa integra vel minute erosa erecto-patentia; staminodia nulla; ovarium ovoideum  $\frac{2}{3}$  mm. longum apice ad stylum 1 mm. longum abeuns; stylus columniformis glaber apice breve 3-lobatus, lobis plus minus recurvis. Fructus obovoideus 2–2 $\frac{1}{2}$  mm. longus glaber abortu 2-spermus; semina irregulariter oblonga vel rotundata 1–1 $\frac{1}{2}$  mm. longa rubescentia eleganter minuteque reticulata.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

Near *Eurya japonica* THUNB.; but differs from it in the much smaller, thinner and acuter leaves.

**Eurya Matsudai** HAYATA sp. nov. (Fig. 5). Frutex. Rami et ramuli gracillimi subrecti subglabri. Folia alterna chartacea lanceolata vel oblongo-lanceolata 7–8 cm. longa 2–2 $\frac{1}{2}$  cm. lata apice caudato-acuminata basi obtusa margine serrulata utraque pagine glabra, costa supra impressa subtus promi-

nente elevata, venis venulisque utraque pagine tenuiter elevatis, petiolis 2–3 mm. longis glabris. Flores ad axillas foliorum fasciculati, pedicellis 2 mm. longis minute hirsutis apice infra calycem bracteis duabus minutis instructis. Fl. ♂: sepala 4–6, imbricata oblongo-triangularia 1 $\frac{1}{2}$  mm. longa 1 $\frac{1}{2}$  mm. lata apice obtusa breve apiculata intus glabra dorso extus minute villosa margine integra minute ciliolata; petala 5, obovato-oblonga 4 mm. longa 1 $\frac{1}{2}$  mm. lata apice rotundata breve apiculata.

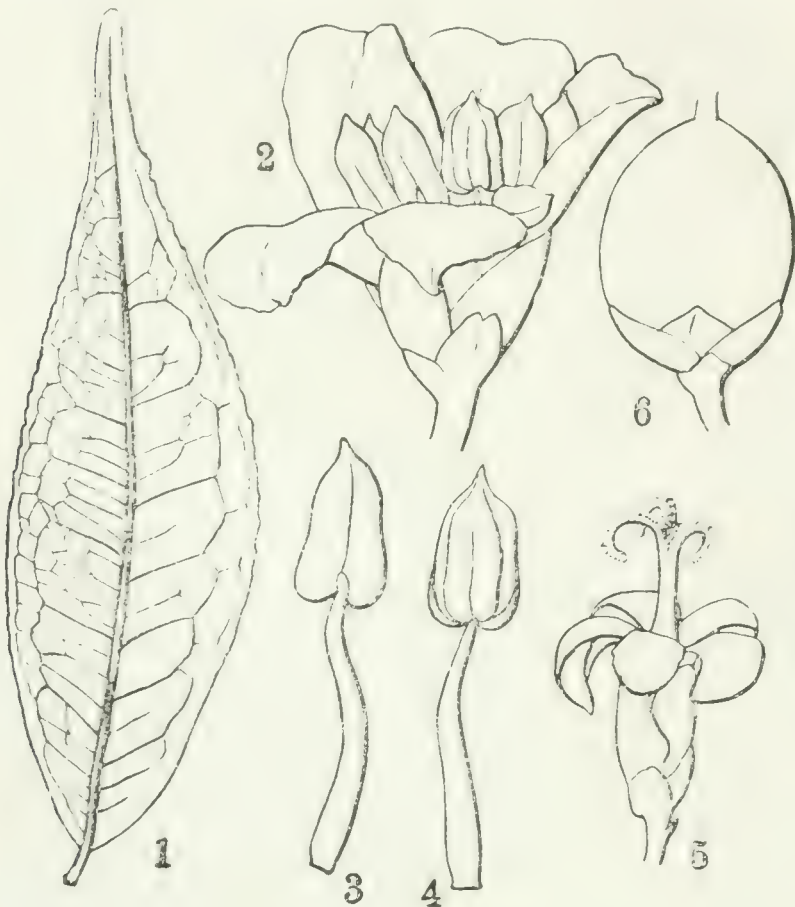


Fig. 5; *Eurya Matsudai* HAYATA; 1, a leaf; 2, a male flower; 3, 4, a stamen, seen from different sides; 5, a female flower; 6, an immature fruit.

basi angustata basi connata glabra; stamina 9–10 basi petali affixa, filamentis glabris filiformibus 2 mm. longis, antheris ovatis 1 mm. longis apice aristato-apiculatis basi truncatis cordatis; ovarii rudimentum nullum. Fl. ♀: minores quam fl. ♂, tubuloso-patentes 3 mm. longi; sepala imbricata inæqualia oblonga vel triangulari-ovata 2 mm. longa; petala 5, lineari-oblonga basi deorsum connata  $2\frac{1}{2}$ –3 mm. longa apice acuta margine integra vel minute erosa; ovarium glabrum ovoideum 1 mm. longum  $\frac{2}{3}$  mm. latum, stylo  $1\frac{1}{2}$  mm. longo columniformi glabro apice 3-fido. Fructus ovoideus 4 mm. longus 3 mm. latus minute muricatus vel sublævis ∞-spermus; semina minute numerosissima oblonga angulata 1 mm. longa minute reticulata.

HAB. Daibusan, leg. Y. MATSUDA, Nov. 1918. (Fl. et fr.)

Near *Eurya arisanensis* HAY.; but differs from it in having leaves which have finely elevated veinlet on the upper surface.

### *Camellia* LINN.

***Camellia theifera*** (GRIFF.) DYER; COHEN STUART Voorbereidende onderzoekingen ten dienste van de selectie der theeplant p. 107, var. **assamica** (MASTERS). *Thea chinensis* HAYATA Gen. Ind. p. 8. pro parte (non SIMS.)

HAB. Suisha.

## Dilleniaceæ.

### *Actinidia* LINDL.

***Actinidia gnaphalocarpa*** HAYATA sp. nov. Frutex scandentissimus; rami glabri, ramulis sursum rubro-fusco-tomentosis. Folia alterna chartacea oblongo-ovata 10–14 cm. longa 6–8 cm. lata apice cuspidato-acuminata basi rotundata margine subintegra vel remote mucronibus instructa supra glabra subtus stellato-tomentosa, costis venis venulisque supra impressis subtus prominente elevatis, petiolis 3–4 cm. longis. Flores ignoti. Cymæ fructiferae axillares, pedunculis 6–7 cm. longis; fructus oblongo-globosus fulvo-tomentosus.

*Actinidia Championi* HAYATA Gen. Ind. p. 47, (non BENTH.)

HAB. Uraisha, Suisha.

Closely allied to *A. Championi* BENTH., to which it was formerly referred

by myself and others. But, in comparing it with the latter species which I had an opportunity to collect in Hongkong in the summer, 1917, I have found that they are quite different. The leaves of the Formosan plant are much more tomentose beneath than those of the Hongkong. The transverse veinlets of the former are reddish, while those of the latter are not colored.

## Sterculiaceæ.

### *Reevesia* LINDL.

***Reevesia formosana*** HAYATA sp. nov. Arborescens; ramis validibus cinerascentibus. Folia alterna lanceolata vel oblanceolata tenuiter coriacea vel chartacea 7-9 cm. longa  $2\frac{1}{2}$ -3 cm. lata apice obtusa basi cuneata margine subintegra utraque pagine subglabra, costis venis venulisque utraque pagine elevatis, petiolis  $1\frac{1}{2}$ -2 cm. longis glabris. Flores ignoti. Fructus versus apicem 2-3-dispositi capsulares 5-carpellares lignosi semiglobosi, in sectione longitudinali obcordati  $2\frac{1}{2}$  cm. longi totiusque lati profunde 5-sulcati et lobati, septicide et loculicide dehiscentes; semina in quoque loculo 2 ab apice loculi pendula obovata 7 mm. longa superposita longe lateque alata, cum alis cultriformia cum alis circ. 2 cm. longa; testa cartilaginea basi et latere ad alam producta; albumen copiosum; embryo magnus toto cavo seminum extensus; cotyledones foliosæ, radícula infera.

HAB. Hiiranzan, leg. B. HAYATA et S. SASAKI, Juli. 1912.

Somewhat comparable to *R. thyssoides* LINDLE, *R. Wall'chii* BR. and *R. pubescens* MAST.; but differs from them by the leaves which are cuneate or acute at the base. The leaves of the other species are more or less rounded at the base.

## Rutaceæ.

### *Phellodendron* RUPR.

***Phellodendron Wilsonii*** HAYATA et KANEHIRA sp. nov. Arbor; ramuli teretes glabri lenticellis minutis conspersi. Folia opposita pinnata in ambitu oblonga cum petiolis 27 cm. longa 15 cm. lata imparipinnata, pinnis 4-5-jugis, jugis a se 4 cm. remotis, pinnis mediis majoribus plus minus obliquis



ovato-oblongis 9 cm. longis 4 cm. latis apice acuminatis basi oblique truncatis margine minute crenulatis vel subintegris chartaceis utraque pagine subglabris, subtus pallidissimis, costis venis venulis supra minus subtus plus elevatis, subtus ad costas dense hirsutis; petiolulis 4 mm. longis; pinna terminali ovato-oblonga, petiolulis 2 cm. longis; rhachibus foliorum hirsutis; petiolis communibus 4 cm. longis. Cymæ fructiferae terminales 8 cm. longæ totiusque latæ; fructibus globosis in exsiccato nigricantibus 7 mm. longis baccatis 5-cocceis, Cocceis cartilagineis oblongis complanatis  $5\frac{1}{2}$  mm. longis  $2\frac{1}{2}$  mm. latis 2-valvatim dehiscentibus 1-spermis. Semina semi-oblonga  $4\frac{1}{2}$  mm. longa  $2\frac{1}{2}$  mm. lata complanata nigricantia impresso-reticulata.

HAB. Mt. Arisan, leg. R. KANEHIRA et S. SASAKI, Oct. 1918.

Very near *Phellodendron amurense*, but distinguishable from it in having much smaller leaves.

## Celastrineæ.

### *Euonymus* LINN.

***Euonymus acutorhombifolia*** HAYATA (Fig. 6) Ic. Pl. Formos. V. p. 56. Descriptio aucta:—Frutex; ramis et ramulis gracilibus tetragonis ad angulos acutis glabris. Folia opposita tenuiter coriacea oblongo-rhomboidea  $5\frac{1}{2}$ –8 cm. longa 2–3 cm. lata apice acuminata ad summum obtusa basi cuneata margine supra medio serrata utraque pagine glaberrima, costis venis venulisque utraque pagine tenuiter graciliter elevatis, petiolis 2 mm. longis. Capsula 4-carpellaris, carpellis sterilibus rotundatis latere complanatis 1 cm. latis et longis alæformibus, carpellis fertilibus 1-spermis rotundatis 7 mm. longis 5 mm. latis apice rotundatis plus minus complanatis; semina oblonga latere plus minus complanata 7 mm. longa 6 mm. lata apice carunculis (vel arillis) oblongis 5 mm. longis carnosis obtecta; testa membranacea rubra; albumine caroso copioso; embryo centralis; cotyledones foliosæ cordatæ 4 mm. longæ, radicula  $1\frac{1}{2}$  mm. longa.

HAB. Ōchōbi, leg. B. HAYATA, Mai. 1916; Daibusan, leg. Y. MATSUDA, Jan. 1917, (fructus!).

NOTE: Petals 4, yellowish brown; ovary reddish.



Fig. 6; *Euonymus acutorhombifolia* HAYATA; 1, a branch; 2, a flower; 3, the same, seen from back; 4, a petal; 5, a dehiscent capsule, a seed seen; 6, a seed with an aril; 7, the same, aril taken off; 8, section of the same, embryo seen.

**Euonymus batakensis** HAYATA sp. nov. (Fig. 7). Frutex, ramis et ramulis rectis, ramulis tetragonis tenuiter vel haud alatis glaberrimis. Folia opposita chartacea vel tenuiter coriacea oblonga obovata vel lanceolata 5-6 cm. longa  $2\frac{1}{2}$ -3 cm. lata apice obtusa acuta vel acuminata basi acuta margine crenulato-serrulata utraque glaberrima, costis et venis supra distincte elevatis



Fig. 7; *Euonymus batakensis* HAYATA; 1, a branch; 2, a flower, seen from back; 3, the same, seen from front; 4, a petal; 5, a stamen, seen from different sides.



gracillimis, petiolis 5–10 mm. longis plus minus alatis. Cymæ axillares longe pedunculatæ, pedunculis 5 cm. longis, ramosæ, pedicellis 1 cm. longis. Calyx rotundatus planus 5 mm. in diametro margine denticulatus 4-lobatus, lobis fere obsoletis. Petala 4 rotundato-oblonga 6 mm. longa  $5\frac{1}{2}$  mm. lata apice rotundata basi plus minus contracta margine integra vel erosa. Stamina 4 intra discum disposita, filamentis brevibus 2 mm. longis glabris, antheris obreniformibus  $1\frac{1}{2}$  mm. latis  $\frac{2}{3}$  mm. longis. Discus planus lævis. Ovarium tetragono-conicum brevissimum, stylo  $1\frac{1}{2}$  mm. longo.

*Euonymus Tanakæ* HAYATA Gen. Ind. p. 14. (pro parte) (non MAXIM.)

HAB. Inter Shingiō et Batakan leg. B. HAYATA et S. SASAKI, Aprili. 1917.

This is closely allied to *Euonymus Tanakæ* MAXIM.; but differs from it in the much slenderer branches, smaller and thinner leaves, and in the much slenderer axillary cymes. The cymes of the new species are solitary and axillary along the branches from the base to the top of young shoots, while those of *E. Tanakæ* are only on the apex and nearly so congested as they would be better described as “quasiterminal.”

***Euonymus kuraruensis*** HAYATA sp. nov. (Fig. 8). Frutex ramosissimus, ramulis glabris. Folia opposita oblongo-obovata vel -ovata  $4\frac{1}{2}$  cm. longa 3 cm. lata apice obtusa vel obtusissima basi cuneata vel obtusa margine remote serrulata vel crenata coriacea utraque glaberrima, costis supra acute elevatis subtus planis haud vel vix elevatis; petiolis 5 mm. longis; folia minora 3 cm. longa 2 cm. lata. Cymæ axillares vel subterminales longe pedunculatis paucifloratis, pedicellis 2 mm. longis. Calyx glaber planus 4 mm. in diametro 4-partitus, sepalis rotundatis 2 mm. longis  $2\frac{1}{2}$  mm. latis apice truncatis vel rotundatis margine integris. Petala 4 rotundata  $4\frac{1}{2}$  mm. longa totiusque lata margine integra vel obscure crenulata apice rotundata basi valde contracta margine exteriori recurvata valde convoluta. Stamina 4, filamentis valde recurvis 3 mm. longis apice subulatis, antheris cordato-rotundatis 1 mm. longis totiusque latis fere 2-partitis apice rotundatis vel emarginatis versatilibus. Ovarium depresso-conicum echinatum, stylo columniformi  $2\frac{1}{2}$  mm. longo apice acuto.

HAB. Kuraru, leg. B. HAYATA, Juni. 1912; Raisha, leg. Y. MATSUDA, Juli. 1915.

Near *E. Spraguei* HAY.; but differs from it in the obovate obtuse leaves with much thicker texture.



Fig. 8; *Euonymus leucocarpus* HAYATA; 1, a branch; 2, 3, flowers; 4, a petal; 5, 6, 7, stamens, seen from different sides; 8, a flower, petals and style taken off; 9, a style.



Fig. 9; *Euonymus Matsudai* HAYATA; 1, a branch; 2, a flower, petals taken off; 3, a petal; 4, a stamen.



**Euonymus Matsudai** HAYATA (Fig. 9). Frutex, rami et ramuli graciles glabri tetragoni. Folia opposita chartacea oblongo-lanceolata 10–12 cm. longa  $3\frac{1}{2}$ – $4\frac{1}{2}$  cm. lata apice acuminata ad summum obtusa basi triangulari-acuta margine integra utraque pagine glabra supra opacissima subtus subnitida (in exsiccato), venis venulis supra subimpressis subtus elevatis, petiolis 7 mm. longis glabris. Cymæ terminales 1 cm. longæ pauci-floratæ, bracteolis duabus lanceolatis serrulatis, pedicellis 3–4 mm. longis. Calyx glaber patens 7 mm. in diametro 4-lobatus, lobis latissimis brevissimis  $1\frac{1}{2}$  mm. longis  $3\frac{1}{2}$  mm. latis late rotundatis margine minute crenulatis. Petala 4, late obovato-rotundata, 5–6 mm. longa 6 mm. lata apice rotundata basi contracta utraque glabra margine erosa vel lacera. Stamina 4, antheris sessilibus vel brevissime stipitatis obreniformibus  $\frac{2}{3}$  mm. longis  $1\frac{1}{4}$  mm. latis glabris. Discus subplanus quadrati-formis  $3\frac{1}{2}$  mm. in diametro toto cum cupula calycis connatus glaber margine tenuissime 4-lobatus. Ovarium brevissimum tetragono-pyramidale 2 mm. latum  $1\frac{1}{2}$  mm. longum.

HAB. Daibuzan, ad 8000 ped. alt. leg. Y. MATSUDA, Mai. 1918.

Differs from all the species of the genus in Formosa, in the leaves which are very dull on the upper side, but rather shining on the under surface, in dried specimens.

**Euonymus pellucidifolius** HAYATA Ic. Pl. Formos. V. p. 57, t. X.

This is very near to *E. longifolius* CHAMP., which I collected in Hongkong in the summer, 1917. The latter plant has the much longer and narrower leaves.

### *Celastrus* LINN.

**Celastrus Hindsii**, BENTH.; FORBES et HEMSL. Ind. Fl. Sin. I. p. 123; *C. monospermus* BENTH. Fl. Hongk. p. 63; DUNN et TUTCHER Fl. Hongk. et Kwangt. p. 62.

HAB. Daibuzan, leg. Y. MATSUDA.

Identical with the Hongkong plant collected by myself in the summer, 1917.

**Celastrus patentiflorus** HAYATA sp. nov. (Fig. 10). Scandens, rami rugosissimi lenticellati glabri. Folia primum membranacea alterna obovato-

oblonga 13 cm. longa 6–7 cm. lata apice rotundata sed centrum breve caudata,

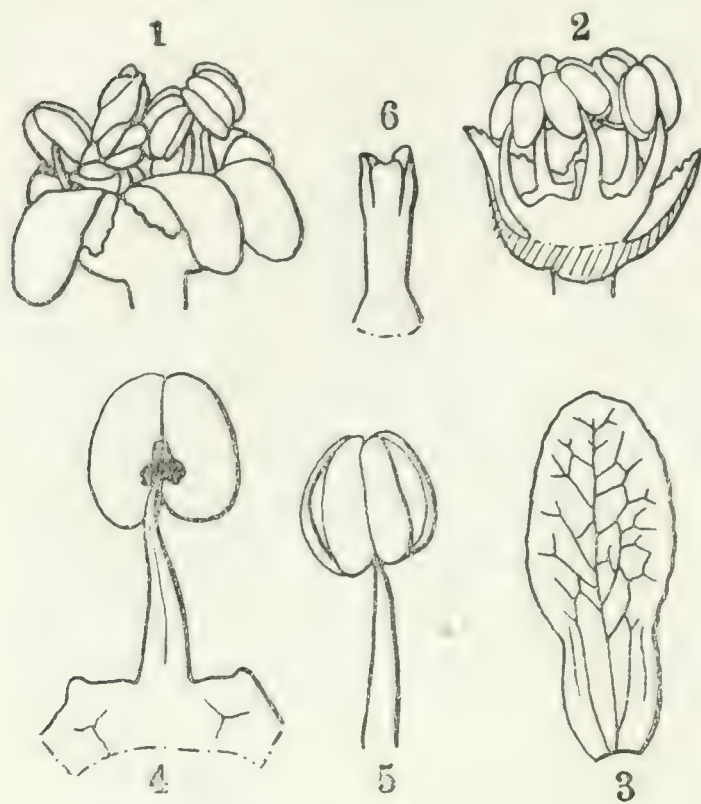


Fig. 10; *Celastrus patensiflorus* HAYATA; 1, a flower; 2, the same, petals taken off; 3, a petal; 4, a stamen on the disc; 5, another stamen seen from a different side; 6, rudimentary ovary.

caudis triangularibus 8–10 mm. longis basi 4–5 mm. latis, basi acuta margine remote serrulata utraque pagine glaberrima, costis venis venulisque utraque pagine minute reticulatis elevatis, petiolis  $1\frac{1}{2}$  cm. longis. Racemi paniculati axillares vel laterales 3–4 cm. longi 2–3 cm. lati glabri, pedunculis complanatis glabris, floribus ad apicem ramorum umbellatim dispositis, pedicellis ultimis 5 mm. longis teretibus basi bracteis minutis subulatis fimbriatis 1 mm. longis instructis, pedicellis ad medium articulatis. Calyx late campanulatus  $3\frac{1}{2}$  mm. in diametro

2 mm. longus ad medium 5-lobatus, lobis triangulari-oblongis  $1\frac{1}{2}$  mm. longis totiusque latis apice obtusissimis minute denticulato-ciliolatis glabris erectis. Petala 5 patentissima reflexo-recurva elongato-oblongo-linearia  $4\frac{1}{2}$ –5 mm. longa 2 mm. lata apice obtusissima basi angustata glabra margine minute denticulata. Stamina 5, filamentis incrassatis glaberrimis apice subulatis  $2\frac{1}{2}$  mm. longis, antheris cordato-reniformibus  $1\frac{1}{4}$  mm. latis 1 mm. longis apice obtusis basi profunde 2-lobatis dorso basi medio glandulis 1–2 fuscentibus punctatis. Discus late cupuliformis 2 mm. in diametro margine erosus staminifer. Ovarium (rudimentum?) columniforme glabrum 2 mm. longum apice 3-lobatum.

HAB. Kiuhabon, leg. B. HAYATA, Aprili. 1916.

Near *C. Kusanoi* HAY.; but differs from it in having much patent flowers with quite glabrous filaments and in the leaves which are cuneate or acute



Fig. 11; *Cassine Matsudai* HAYATA; 1, a branch; 2, 3, flowers; 4, a petal; 5, ovary and stamens; 6, ovary; 7, 8, a stamen on a disc, seen from different sides; 9, a marginal portion of a sepal.



at the base. The flowers of *C. Kusanoi* are half-closed, the filaments are slightly and shortly hairy, and the leaves are rather rounded at the base.

NOTE: Leaves dark-green shining above; flowers beautifully pale fresh green; anthers yellow.

*Cassine* LINN.

**Cassine Matsudai** HAYATA sp. nov. (Fig. 11). Frutex; rami et ramuli graciles tetragoni glabri. Folia opposita lanceolata 7–8 cm. longa  $1\frac{1}{2}$ – $2\frac{1}{2}$  cm. lata apice acuminata vel caudato-acuminata basi cuneato-acuminata integra costa supra elevata, venis venulis supra haud subtus tenuissime elevatis, utraque pagine glaberrima, petiolis 5 mm. longis. Cymæ  $1\frac{1}{2}$  cm. longæ ad axillas dense fasciculatæ glabræ, floribus oppositis, pedicellis ultimis  $1\frac{1}{2}$  mm. longis glabris, bracteis crassiusculis triangularibus 1 mm. longis apice acutis margine denticulatis fulvo-marginatis, bracteolis oppositis 2 bractea conformibus. Sepala 5, subæqualia late rotundata 1 mm. longa  $1\frac{1}{2}$  mm. lata margine fimbriato-ciliolata fulvo-marginata glabra. Petala 5 oblonga  $1\frac{3}{4}$  mm. longa  $1\frac{1}{4}$  mm. lata apice rotundata basi haud vel vix contracta glabra. Stamina 5, margine disci affixa, filamentis brevibus  $\frac{1}{2}$  mm. longis, antheris rotundatis apiculatis  $\frac{1}{4}$  mm. longis. Ovarium conico-ovoideum glabrum  $1\frac{1}{2}$  mm. longum  $\frac{2}{3}$  mm. latum, stigmata digitiforme 4-partita. Discus annularis lamelliformis 5-lobatus  $\frac{1}{3}$  mm. altus.

*Otherodendron Matsudai* HAYATA, in Herb. Taihoku.

HAB. Buizan, leg. Y. MATSUDA, Jan. 1919.

Near *Cassine micrantha* HAYATA, but differs from it in the much thinner leaves with the lateral veins arranged in a much acuter angle.

Leguminosæ.

*Crotalaria* DILL.

**Crotalaria akoensis** HAYATA sp. nov. (Fig. 12). Suffrutex erectus; caulis 10–40 cm. longus in exsiccato fuscens fulvo-hirsutus teres foliatus. Folia alterna simplicia oblonga vel oblongo-lanceolata 2–4 cm. longa 12 mm. lata apice acuta obtusa integra supra in exsiccato fuscissima utraque pagine adpresse hirsuta, petiolis 3 mm. longis fulvo-hirsutis, stipulis nullis? Flores

breve racemosi, racemis terminalibus pauci-floratis, pedicellis 4 mm. longis dense strigoso-hirsutis, bracteolis duabus basi calycis dispositis linearibus 8 mm. longis 1 mm. latis acuminatis. Calyx campanulatus 1 cm. longus 1 cm. latus extus strigoso-fulvo-hirsutus intus glaber supra basin sursum 5-lobatus, lobis lateralibus linearibus 10 mm. longis 2-3 mm. latis acuminatis linearibus vel oblongo-linearibus. Petala 5: vexillum obovato-rotundatum 9 mm. longum 7-8 mm. latum apice emarginatum basi breve unguiculatum prope basin 1-appendiculatum, ungue 1 mm. longo totiusque lato; alæ obovato-oblongæ 7 mm. longæ 3½ mm. latæ apice obtusissimæ basi breve

unguiculatæ, unguibus 1½ mm. longis ⅔ mm. latis; carinæ elongato-oblongo-triangulares 8 mm. longæ 4 mm. latæ apice attenuato-rostratæ ad summum obtusæ basi late triangulari acutæ breve unguiculatæ, unguibus 1 mm. longis ⅔ mm. latis, ad margine lateris superioris eroso-ciliatæ. Stamina diadelpa, antheris linearibus 1 mm. longis. Ovarium oblongo-lineare 3 mm. longum 1 mm. latum apice declinatum rostratum valde complanatum basi obtusum glabrum, stylo basi subito reflexo-ascendenti, parte ascendenti erecta recta apice et latere interiore dense hirsuta. Legumen cartilagineum obovoideo-ellipsoideum 13 mm. longum 6 mm. latum glabrum sutura superiore dehiscens.

HAB. Akôchô: Naiho, leg. Y. MATSUDA, Sept. 1915.

Near *C. ferruginea* GRAH.; but differs from it by the much shorter pods.

### *Indigofera* LINN.

*Indigofera formosana* MATSUMURA Conspect. Legumin. p. 8.

*Indigofera macrostachya* HAYATA (non VENT) Gen. Ind. Fl. Formos. p. 20.

Remarkable for the very long racemes.

*Indigofera mansuensis* HAYATA sp. nov. (Fig. 13). Frutex, rami et ramuli flexuosi fusco-purpurascens trectes. Folia alterna impari-pinnata in ambitu linearia 8-9 cm. longa 2½-3 cm. lata, pinnis lateralibus 6-7-jugis oppositis a se 5-7 mm. remotis ellipticis vel obovato-ellipticis inferioribus



Fig. 12; *Crotalaria alcoensis* HAYATA; 1, a leaf; 2, a pod with the calyx; 3, a seed.



minoribus superioribus majoribus  $1\frac{1}{2}$  cm. longis 5–6 mm. latis apice rotundatis ad centrum summi breve aristatis basi obtusis vel cuneato-obtusis margine



Fig. 13; *Indigofera mansuensis* HAYATA; 1, a leaf; 2, a pod.

integris utraque pagine tenuiter adpresse hirsutis, subtus adpresse glanduloso-punctatis, petiolulis  $1\frac{1}{2}$  mm. longis, stipellis subulatis 1 mm. longis, pinna terminali majore  $1\frac{1}{2}$  cm. longa 7–8 mm. lata; interjugiis 6–7 mm. longis adpresse hirsutis semi-teretibus supra late sulcatis, petiolis communibus 1 cm. longis, stipulis subulato-triangularibus 2 mm. longis. Flores ignoti. Legumen lineare 6–7 cm. longum 3 mm. latum plus minus complanatum apice longe rostratum utroque latere costulatum facie subplanum adpresse tenuiter hirsutum basi obtusum, pedicellis 4 mm. longis. Semina ignota.

HAB. Akō, Mansu, leg. Y. MATSUDA, Mai. 1916.

Near *Indigofera tinctoria* LINN.; but differs from it in the much longer straight pods.

***Indigofera venulosa* CHAMP. var. *glauca* HAYATA n. v.** Frutex 20–30 cm. longus ramosissimus, ramis et ramulis gracilibus glaucis plus minus flexuosis angulatis. Folia pinnata in ambitu linearia imparipinnata, pinnis lateralibus oppositis 7–jugis subconformibus ovato-oblongis 18 mm. longis 10 mm. latis obtusis ad summum breve aristatis basi obtusis integris supra glabris in exsicco fuscantibus subtus glaucis adpresse hirsutis, stipellis minutis subulatis  $\frac{1}{2}$  mm. longis, rhachibus inter jugos 1 cm. longis, petiolis communibus 1 cm. longis, stipulis lineari-lanceolatis 4 mm. longis. Racemi terminales simplices vel axillares 10–15 cm. longi dense floriferi, pedicellis 2 mm. longis. Calyx late campanulatus 2 mm. longus 4 mm. latus tenuiter hirsutus apice 5-lobatus, lobis triangularibus inæqualibus acutis. Petala 5: vexillum ellipticum 12 mm. longum 8 mm. latum apice truncatum plus minus emarginatum basi truncato-triangulari-acutum margine minutissime hirsutum extus minute



hirsutum intus glabrum; alæ lineares 12 mm. longæ  $2\frac{1}{2}$  mm. latæ plus minus recurvæ apice obtusæ deorsum plus minus hirsutæ basi acutæ; carinæ cultriformes 14 mm. longæ 4 mm. latæ apice obtusæ ad marginem et prope marginem hirsutæ basi cuneatæ prope basin e facie exteriori gibboso-appendiculatæ. Stamina diadelpa, antheris ovato-oblongis 1 mm. longis  $\frac{2}{3}$  mm. latis apice appendiculatis basi emarginatis apice basique barbatis. Ovarium lineare 10 mm. longum  $\frac{1}{3}$  mm. latum, stylo superne recurvo 3–4 mm. longo glabro apice capiculato. Legumen fusco-purpurascens lineare 5 cm. longum 3–4 mm. latum glabrum latere complanatum. Semina ignota.

HAB. Tochikoan, Daitōsei, Holisha, Ritōzan.

Near the type; but differs from it in having much smaller leaves which are very glaucous on the under side.

### *Tephrosia* PERS.

***Tephrosia ionophlebia*** HAYATA sp. nov. Suffrutex ramosissimus, rami et ramuli pallido-flavescentes tenuiter pubescentes flexuosi foliati. Folia alterna imparipinnata in ambitu lineari-oblonga 6–8 cm. longa  $2\frac{1}{2}$  cm. lata, pinnis lateralibus 9–10 jugis oppositis, mediis majoribus obovato-linearibus 18 mm. longis 5 mm. latis apice obtusissimis mucronatis basi gradatim obtuso-cuneatis margine integris supra subglabris subtus dense patente brevique hirsutis, costis venis venulisque purpureo-coloratis, petiolulis 1–2 mm. longis dense hirsutis, stipellis nullis, interjugiis 5 mm. longis, petiolis communibus 13 mm. longis dense hirsutis, stipulis linearibus 5–6 mm. longis 1 mm. latis apice acuminatis extus hirsutis intus glabris. Racemi terminales folio breviores erecti 4–5 cm. longi hirsuti, floribus ad nodos fasciculatim dispositis, fasciculis 5–7-floratis basi bracteatis, bracteis linearibus 5–6 mm. longis hirsutis, bracteolis minutis, pedicellis florum gracilibus 4 mm. longis hirsutis. Calyx campanulatus 3 mm. longus totiusque latus medio sursum 5-lobatus, lobis superioribus usque ad medium connatis, lateralibus cuspidato-triangularibus 2 mm. longis 1 mm. latis apice cuspidatis extus dense intus tenuiter hirsutis. Petala 5: vexillum 8 mm. longum (cum ungue) 8 mm. latum late rotundatum apice emarginatum basi late unguiculatum, ungue obtriangulari 2 mm. longo 2 mm. lato basi acuto, intus glabrum extus hirsutum: alæ late

lineares 7 mm. longæ (unguibus exceptis) 2–3 mm. latæ apice obtuso-truncatæ, basi unguiculatæ, unguibus  $2\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis glabræ; carinæ (unguibus exceptis) ovatæ  $3\frac{1}{2}$  mm. longæ  $2\frac{1}{2}$  mm. latæ apice acutæ basi oblique ad unguem abeuntes, unguibus linearibus 3 mm. longis  $\frac{1}{3}$  mm. latis. Stamina diadelpa, tubo superne minute appendiculato, antheris oblongis  $\frac{1}{3}$  mm. longis. Ovarium lineare 3 mm. longum  $\frac{1}{2}$  mm. latum basi hirsutum sursum glabrum apice ad stylum abeuns, stylo valde latere complanato 3 mm. longo glabro apice punctiformi. Legumen lineare 4 cm. longum 4 mm. latum apice acutum.

HAB. Tōseikaku, Pinan.

Near *Tephrosia purpurea*; but differs from it in the leaves which are purple colored on the under side, and are dispersed with rather spreading hairs. In *T. purpurea*, the leaves are pale on the under surface and are dispersed with very adpressed hairs.

### *Dumasia* DC.

***Dumasia bicolor*** HAYATA (Pl. I.) Fl. Mont. Formos. p. 75. Descriptio aucta:—Legumen supra calycem breve stipitatum, stipite 2 mm. longo, globoso-fusiforme basi apiceque acutum, valvis coriaceis facie minute villosa-hirsutis, 1–2 cm. longum 8 mm. latum 1–2-spermum. Semina globosa  $5\frac{1}{2}$  mm. longa  $4\frac{1}{2}$  mm. lata nitida primum glauca fuscentia.

HAB. Arisan, leg. B. HAYATA.

### *Millettia* W. et ARN.

***Millettia taiwaniana*** (MATSUM.) (Pl. II.) HAYATA n. n. Descriptio aucta:—Racemi simplices vel paniculati 10–20 cm. longi, fulvo-tomentosi, floribus ad nodos 2–3-fasciculatim dispositis, rhachis fasciculorum nodiformi, bractea basi nodi insita triangulari 2 mm. longa  $1\frac{1}{2}$  mm. lata apice acuta intus glabra extus hirsuta; bracteolis duabus ad basin calycis insitis  $1\frac{1}{2}$  mm. longis ovatis obtusis, pedicellis 4 mm. longis hirsutis. Calyx globoso-campulatus 5–6 mm. longus 7–8 mm. latus extus breve hirsutus crassiusculus intus glaber margine late 5-dentatus. Petala 5: vexillum obovato-oblongum 2 cm. longum  $1\frac{1}{2}$  cm. latum apice emarginatum basi breve unguiculatum, ungue 3 mm. longo  $1\frac{1}{2}$  mm. lato, prope apicem ad marginem hirsutum cæterum glab-



rum; alæ oblongo-lineares cum ungue 18 mm. longæ 6 mm. latæ apice obtusæ basi longe unguiculatæ, ungue 5-6 mm. longo 1 mm. lato; carinæ obovato-cultriformes cum ungue 2 cm. longæ apice obtusæ basi longe unguiculatæ, unguibus 5 mm. longis 1 mm. latis, sursum prope apicem ad marginem dense hirsutæ. Stamina monadelpha, antheris ovato-oblongis  $1\frac{1}{4}$  mm. longis 1 mm. latis apice obtusis basi 2-lobatis. Ovarium 5-6 mm. longum lineare 2 mm. latum dense fulvo-hirsutum apice gradatim ad stylum abeuns, stylo 10-12 mm. longo deorsum hirsuto apice oblique truncato stigmatifero.

*Millettia pachycarpa* HAYATA Gen. Ind. Fl. Formos. p. 21 (non BENTH.)

*Pongamia taiwaniana* HAYATA Ic. Pl. Formos. III. p. 79.

*Derris taiwaniana* MATSUM. in Sched. Herb. Tōkyō.

HAB. Shinjō, Kauiran, Toseikaku, Sankakuyū.

Differs from *Millettia pachycarpa* BENTH., in the always 1-seeded ovoid pods.

### *Desmodium* DESV.

***Desmodium akoense*** HAYATA sp. nov. (Fig. 14). Basi suffrutescens haud volubilis. Caulis gracillimus tetragonus tenuiter hirsutus. Folia 3-foliata, foliolo terminali obovato-oblongo vel oblongo vel lanceolato 2-2 $\frac{1}{2}$  cm. longo 1-1 $\frac{1}{2}$  cm. lato integro apice obtusissimo vel rotundato ad centrum minute mucronato basi obtusissimo membranaceo supra subtusque depresso-hirsuto subtus glauco, foliolis lateralibus minoribus, petiolulis 1 $\frac{1}{2}$  mm. longis tomentosis, stipellis 1 mm. longis subulatis, petiolis communibus 1-1 $\frac{1}{2}$  cm. longis hirsutis, stipulis triangulari-lanceolatis 2 mm. longis obliquissimis strigoso-hirsutis. Racemi simplices vel paniculati terminales vel axillares laxè florati, floribus fasciculatis, fasciculis basi 1-bracteatis, bracteis ovato-lanceolatis 2 mm. longis  $\frac{1}{2}$  mm. latis strigoso-hirsutis, bracteolis lanceolatis 1 mm. longis, pedicellis 2-3 mm. longis. Calyx late obconico-campanulatus 2 $\frac{1}{2}$  mm. longus a basi sursum 5-lobatus, lobis superioribus fere totoconnatis. Petala 5 : vexillum obtriangu-



Fig. 14; *Desmodium akoense* HAYATA; 1, a leaf; 2, a pod.



lare 3 mm. longum  $3\frac{1}{2}$  mm. latum apice latissimum basi acutum; alæ late lineares  $3\frac{1}{2}$  mm. longæ 1 mm. latæ apice obtusissimæ basi breve unguiculatæ, unguibus  $\frac{2}{3}$  mm. longis; carinæ longe unguiculatæ, unguibus 2 mm. longis  $\frac{1}{4}$  mm. latis, laminis oblique obovatis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis. Stamina diadelpa, antheris rotundatis. Ovarium lineare  $3\frac{1}{2}$  mm. longum  $\frac{1}{3}$  mm. latum glabrum, stylo 1 mm. longo recurvo. Legumen lineare gracillimum ad nodos constrictum, internodiis articulatis linearibus 5 mm. longis 2 mm. latis breve strigoso-hirsutis scabris.

HAB. Akō, leg. Y. MATSUDA, No. 95, Aprili. 1915.

Near *D. laxiflorum*; but differs from it in the much smaller leaflets with the rounded or even emarginate tip.

**Desmodium Shimadai** HAYATA sp. nov. (Fig. 15). Suffrutex, ramis gracillimis teretibus tenuiter hirsutis erectis scandentibus. Folia simplicia lanceolata 10–14 cm. longa  $2\frac{1}{2}$ –3 cm. lata apice acuminata ad summum obtusa centro mucronata basi obtusissima truncata vel rotundata integra supra glabra subtus tomentella in exsicco utraque pallidissima, supra venis venulisque tenuissime subtus prominente elevatis, petiolis 1– $1\frac{1}{2}$  cm. longis hirsutis, stipellis subulato-lanceolatis 4–5 mm. longis, stipulis oblique lineari-lanceolatis 6 mm. longis 1 mm. latis apice acuminatis glabris margine ciliolatis. Racemi terminales simplices rarius paniculati laxissime florati 15–20 cm. longi bracteati, pedicellis 5–10 mm. longis. Calyx late campanulatus 2–3 mm. longus 5–6 mm. latus extus hirsutus nitus glaber medio sursum 5-lobatus, lobis superioribus fere toto connatis, lobis lateralibus lineari-triangularibus  $2\frac{1}{2}$  mm. longis basi 1 mm. latis margine ciliatis acuminatis. Petala 5: vexillum obovatum 6–7 mm. longum 4 mm. latum apice obtusissimum basi cuneatum integrum; alæ obovato-lineares  $5\frac{1}{2}$  mm. longæ 2 mm. latæ apice obtusissimæ basi breve unguiculatæ, ungue 1 mm. longo; carinæ 7 mm. longæ 2 mm. latæ obtusissimæ basi attenuatæ subunguiculatæ. Stamina diadelpa. Ovarium lineare 5 mm. longum  $\frac{1}{3}$  mm. latum breve hirsutum, stylo 1 mm. longo apice acuto. Legumen longe lineare gracillimum 8 cm. longum 2 mm. latum ad nodos constrictum valde complanatum hirsutum, internodiis 1– $1\frac{1}{2}$  cm. longis.

HAB. Sankakuyū, leg. Y. SHIMADA.

Resembles *D. triquetrum* DC. in the leaves on one side, but on the



Fig. 15; *Desmodium Shimadai* HAYATA; 1, a branch; 2, a flower; 3, a standard; 4, a wing; 5, a keel; 6, 7, diadelphous stamens; 8, an ovary with the calyx.



other, it is very near to *D. laxiflorum* in the inflorescence, flowers and fruits.

*Uraria* DESV.

*Uraria formosana* HAYATA n. n.

*Desmodium formosanum* HAYATA Mater. Fl. Formos. p. 77; Gen. Ind. Fl. Formos. p. 19.

*Uraria latisejala* HAYATA Ic. Pl. Formos. III. p. 70; Gen. Ind. Fl. Formos. p. 22.

HAB. Jicchori, Raisha.

*Uraria yaeyamensis* HAYATA sp. nov. Frutescens circ. 50 cm. alta. Caulis teres tenuiter pubescens. Folia alterna simplicia ovato-rotundata 3 cm.-6 cm. longa  $2\frac{1}{2}$ - $4\frac{1}{2}$  cm. lata apice perfecte rotundata ad centrum aristis minutis mucronata basi late truncato-cordata vel tenuiter cordata margine integra supra minus subtus plus pubescentia, costis venis subtus distincte elevatis, petiolis  $1\frac{1}{2}$ - $2\frac{1}{2}$  cm. longis tenuiter pubescentibus apice stipellis duabus subulato-linearibus 3-4 mm. longis instructis, stipulis cuspidato-triangularibus 7 mm. longis 3 mm. latis apice cuspidatis tenuiter pubescentibus. Spicæ terminales cylindricæ 5-6 cm. longæ  $1\frac{1}{2}$ -2 cm. latæ apice acutæ, densissime floriferæ, bracteis imbricatis ovato-rotundatis apice longe cuspidatis cum cuspidibus 9 mm. longis 6 mm. latis extus dense hirsutis intus glabris, pedicellis 3 mm. longis dense hirsutis. Calyx obconico-campanulatus usque ad medium 5-lobatus extus hirsutus, lobis superioribus elongato-triangularibus  $1\frac{1}{2}$  mm. longis 1 mm. latis apice acuminatis margine ciliatis, lobis lateralibus longe setiformibus 5 mm. longis teretibus longe setuloso-hirsutis, lobo infimo lobis lateralibus conformi. Petala 5: vexillum ovato-rotundatum, ungue obtriangulati-cuneiformi  $1\frac{1}{2}$  mm. longo, lamina 3 mm. longa  $3\frac{1}{2}$  mm. lata late ovato-rotundata integra; alæ cultriformes, ungue lineari 1 mm. longo, laminis oblongo-cultriformibus  $3\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice late truncatis basi latere superiore truncatis latere inferiore acutis; carinæ spathulato-cultriformes 5 mm. longæ  $1\frac{1}{2}$  mm. latæ apice obtusissimæ basi longe attenuatæ. Stamina diadelpa, filamentis fere connatis, partibus liberis  $\frac{1}{2}$  mm. longis, antheris oblongis  $\frac{1}{3}$  mm. longis  $\frac{1}{4}$  mm. latis. Ovarium lineare  $1\frac{1}{2}$  mm. longum, stylo 4 mm. longo glabro filiformi sursum crassiusculo, stigmate terminali.

HAB. Yaeyama, leg. Kanashiro, Juli. 1912.

Perhaps identical with *U. lagopoides* DC.; but differs from it by the nearly equally elongated lower calyx lobes and in the leaves with nearly cordate base.

*Glycine* LINN.

*Glycine pescadrensis* HAYATA sp. nov. Humilis scandentissima. Caulis teres adpresse hirsutus, pilis reflexis. Folia 3-foliata, foliolo terminali oblongo vel lanceolato  $1\frac{1}{2}$ -2 cm. longo 6-8 mm. lato apice obtusissimo basi obtusissimo supra subglabro subtus adpresse hirsuto, foliolis lateralibus paullo minoribus, petiolulis 1 mm. longis, stipellis 1 mm. longis subulatis, petiolis communibus  $1\frac{1}{2}$ -2 cm. longis adpresse hirsutis, stipulis subulato-lanceolatis  $2\frac{1}{2}$  mm. longis. Racemi axillares simplices 6 cm. longi laxè florati, pedicellis 2 mm. longis.



bracteis lanceolatis 2 mm. longis hirsutis, bracteolis duabus basi floris dispositis linearibus  $1\frac{1}{2}$  mm. longis. Calyx tubuloso-campanulatus 4 mm. longus 3 mm. latus modio sursum 5-lobatus, lobis superioribus fere toto connatis lateralibus et infimis lineari-triangularibus 2 mm. longis cuspidiformibus extus hirsutis intus glabris. Petala 5: vexillum (ungue excepto) late rotundatum 5 mm. longum 6 mm. latum apice emarginatum basi late rotundatum integrum, ungue 2 mm. longo  $\frac{2}{3}$  mm. lato; alæ (unguibus exceptis) obovato-lineares  $4\frac{1}{2}$  mm. longæ  $2\frac{1}{2}$  mm. latæ apice rotundatæ basi latere superiore appendiculatæ, unguibus 3 mm. longis  $\frac{1}{2}$  mm. latis; carinæ (unguibus exceptis) obovatæ 3 mm. longæ 2 mm. latæ basi 1-appendiculatæ, unguibus linearibus  $3\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis. Stamina monadelphæ, antheris ellipticis  $\frac{1}{2}$  mm. longis. Ovarium basi breve stipitatum 4 mm. longum  $\frac{2}{3}$  mm. latum dense adpresse hirsutum, stylo  $1\frac{1}{2}$  mm. longo apice capitulato. Legumen lineare 2 cm. longum 4 mm. latum.

HAB. Bōkotō, leg. T. KAWAKAMI, Mai. 1909.

Near *G. clandestina* WENDL.; but differs from it in the very obtuse and mucronate leaflets.

**Glycine subonensis** HAYATA sp. nov. (Fig. 16). Scandentissima volubilis; caulis teres adpresse fulvo-hirsutus, pilis reflexis, remote foliatus. Folia chartacea 3-foliolata, foliolo terminali lineari-lanceolato  $4\frac{1}{2}$ –5 cm. longo 1– $1\frac{1}{3}$  cm. lato apice obtusissimo ad centrum mucronato basi late cuneato vel obtuso integro subtrinervio, nervis lateralibus gracillimis, nervis venulisque supra et subtus tenuissime elevatis, pagine supra tenuissime adpresseque subtus densissime adpresseque hirsuta, foliolis lateralibus paullo minoribus basi latioribus obliquis obtusissimis vel subrotundatis, petiolulis 2 mm. longis dense villosis, stipellis subulatis 1 mm. longis, petiolis communibus 2– $2\frac{1}{2}$  cm. longis reflexo-pilosis, stipulis lanceolato-subulatis hirsutis  $2\frac{1}{2}$  mm. longis. Racemi 8–10 cm. longi axillares simplices, floribus ad nodos simplicibus vel fasciculatis, bracteis ovato-lanceolatis extus hirsutis intus glabris, pedicellis 1 mm. longis hirsutis. Calyx basi bracteolis duabus ovato-lanceolatis  $1\frac{1}{2}$  mm. longis instructus; calyx campanulatus 3 mm. longus  $2\frac{1}{2}$  mm. latus extus hirsutus a medio 5-lobatus, lobis oblongo-triangularibus  $1\frac{1}{2}$  mm. longis 1 mm. latis acuminatis, superioribus longioribus plus minus connatis, extus hirsutis intus glabris. Petala 5:

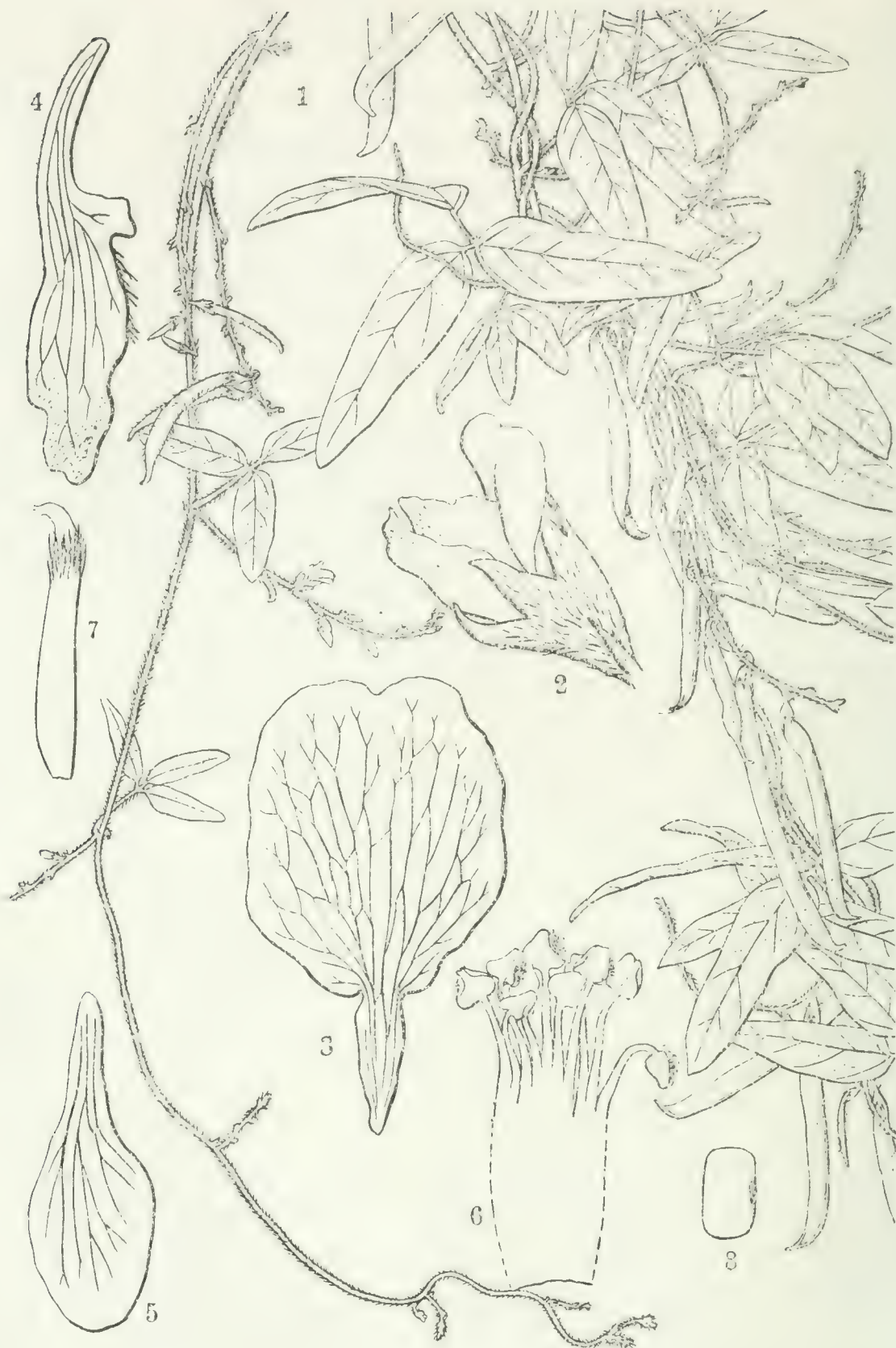


Fig. 16; *Glycine subonensis* HAYATA; 1, the plant; 2, a flower; 3, a standard; 4, a wing; 5, a keel; 6, monadelphous stamens; 7, ovary; 8, a seed.



vexillum obovato-oblongum 4 mm. longum 3 mm. latum apice emarginatum basi unguiculatum, ungue 1 mm. longo  $\frac{2}{3}$  mm. lato; alæ cultriformes 4 mm. longæ 1 mm. latæ apice obtusæ basi unguiculatæ, unguibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{4}$  mm. latis margine lateribus superioribus hirsutæ; carinæ obovato-spathulatæ  $3\frac{1}{2}$  mm. latæ apice obtusæ valde concavæ basi unguiculatæ, unguibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis. Stamina monadelphæ, antheris ovato-cordatis  $\frac{1}{3}$  mm. longis apice acutis basi cordatis. Ovarium lineare 2 mm. longum glabrum sursum prope apicem dense hirsutum  $\frac{1}{2}$  mm. latum, stylo brevissimo  $\frac{1}{4}$  mm. longo glabro, stigmate capitato 2-lobato. Legumen lineare 5 mm. longum 3-4 mm. latum adpresse hirsutum plus minus falcitim recurvum valde complanatum apice subito recurvum. Semina oblonga  $3\frac{1}{2}$  mm. longa 2 mm. lata glabra.

HAB. Subonsha, leg. Y. MATSUDA.

**Glycine tabacina** BENTH.; FORBES et HEMSL. Ind. Fl. Sin. I. p. 189;  
HAYATA Gen. Ind. Fl. Formos. p. 20.

*Glycine tomentosa* HAYATA in Gen. Ind. Fl. Formos. p. 20. (non BENTH.)

HAB. Byōritsu, Pinan, Shintiku.

**Glycine tomentella** HAYATA sp. nov. Scandentissima; caulis teres gracilis reflexo-fulvo-tomentosus remote foliatus. Folia 3-foliata, foliolo terminali majore elliptica 3- $3\frac{1}{2}$  cm. longo 15-18 mm. lato apice obtusissimo vel rotundato ad centrum mucronato basi obtusissimo integro, venis subtus elevatis, utraque pagine tenuiter tomentoso, foliolis lateralibus minoribus 2 cm. longis 13 mm. latis apice obtusissimis basi rotundatis subæqualibus, petiolulis 2 mm. longis tomentosis, stipellis subulatis 1 mm. longis, petiolis communibus 2- $2\frac{1}{2}$  cm. longis tomentosis, stipulis lanceolato-triangularibus  $2\frac{1}{2}$  mm. longis hirsutis. Racemi axillares gracillimi folia multo superantes 8-16 cm. longi, partibus floriferis 2-4 cm. longis, rhachibus gracilibus hirsutis, bracteis minutis lanceolatis hirsutis, pedicellis 1 mm. longis hirsutis solitariis. Calyx tubuloso-campulatus basi bracteolis duabus minutis instructus  $3\frac{1}{2}$  mm. longus 2 mm. latus a medio 5-lobatus, lobis superioribus ad medium connatis, lobis lateralibus lanceolato-triangularibus 2 mm. longis  $\frac{2}{3}$  mm. latis apice acuminatis vel subulato-acuminatis intus glabris extus dense hirsutis. Petala 5: vexillum late rotundatum, lamina  $4\frac{1}{2}$  mm. longa 6 mm. lata apice emarginata, basi unguiculatum, ungue 2 mm. longo cuneiformi; alæ obovato-cultriformes cum ungui-



bus  $1\frac{1}{2}$  mm. longis linearibus 6 mm. longæ 2 mm. latæ apice late truncatæ obtusissimæ basi latere superiore appendiculatæ; carinæ obovato-cultriformes cum unguibus 2 mm. longis linearibus  $4\frac{1}{2}$  mm. longæ apice obtusissimæ basi latere superiore 1-appendiculatæ. Stamina monadelpha, antheris ovato-oblongis. Ovarium lineare 2-3 mm. longum  $\frac{1}{3}$  mm. latum subglabrum sursum dense longeque hirsutum, stylo 1 mm. longo apice capitato. Legumen rectum complanatum 2 cm. longum 4 mm. latum breve reflexo-hirsutum. Semina irregulariter subglobosa  $1\frac{3}{4}$  mm. longa glabra.

HAB. Tainan, Takao, Akao.

Near *G. tomentosa* BENTH., but differs from it in the smaller obovate leaves.

### *Galactia* P. BR.

*Galactia lanceolata* HAYATA sp. nov. (Fig. 17). Scandentissima vel volubilis; caulis teres gracillimus subglaber. Folia alterna 3-foliolata, foliolo terminali lanceolato apice obtusissimo basi obtusissimo vel rotundato-obtuso integro utroque latere tenuissime hirsuto subtus venulis minute reticulato chartaceo, foliolis lateralibus terminali conformibus paullo minoribus, petiolulis

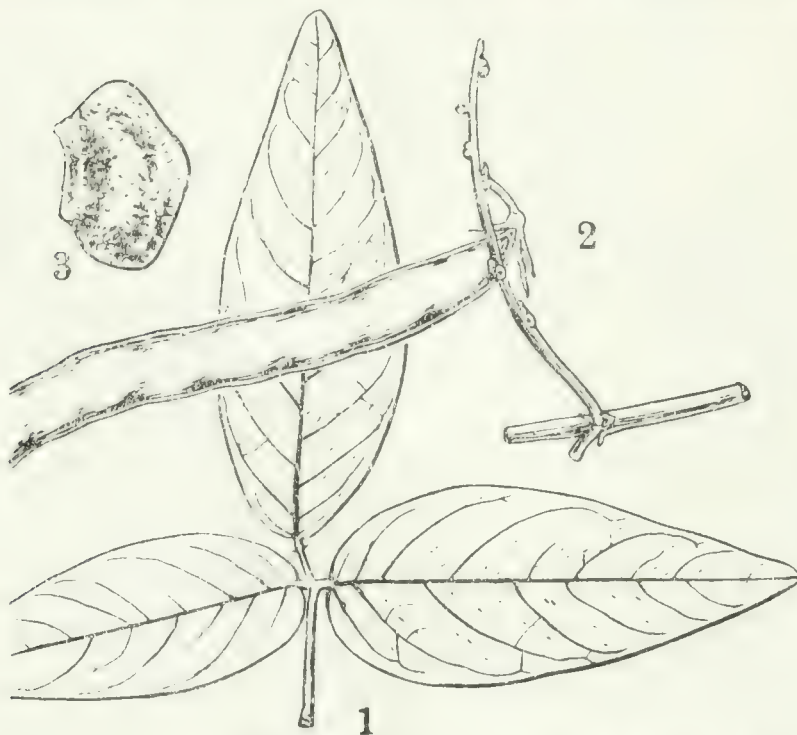


Fig. 17; *Galactia lanceolata* HAYATA; 1, a leaf; 2, a pod; 3, a seed.

2 mm. longis hirsutis, stipellis subulato-triangularibus 1 mm. longis, petiolis communibus  $1-1\frac{1}{2}$  cm. longis, stipulis lanceolato-subulatis  $2\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis acuminatis extus hirsutis intus glabris. Flores ignoti. Legumen lineare 7 cm. longum 6-7 mm. latum valde complanatum subglabrum apice oblique acutum basi oblique obtusum, valvis cartilagineis, 10-spermum. Se-

mina oblonga  $5\frac{1}{2}$  mm. longa 4 mm. lata plus minus complanata glabra.

HAB. Saubonsha, leg. Y. MATSUDA, Jan. 1916.

Near *G. formosana*; but differs from it in the lanceolate leaflets.

*Pueraria* DC.

*Pueraria phaseoloides* BENTH.; HAYATA Gen. Ind. Fl. Formos. p. 22.

HAB. Akō: Naiho, leg. Y. MATSUDA, No. 631.

*Phaseolus* LINN.

*Phaseolus Mungo* LINN.; HAYATA Gen. Ind. p. 21. (Fig. 18). Scandentissima; caulis gracillimus reflexo-pilosus plus minus sulcatus remote foliatus. Folia alterna 3-foliolata, foliolo terminali ovato-rhomboideo 9 cm. longo  $5\frac{1}{2}$  cm. lato apice acuto basi late cuneato margine integro vel plus minus sinuato membranaceo utraque pagine hirsuto vel glabro, foliolis lateralibus aequilongis valde obliquis basi late rotundatis 3-nerviis, petiolulis 3 mm. longis hirsutis, stipellis ovato-lanceolatis 5 mm. longis apice subulato-acuminatis glabris, petiolis communibus 6–10 cm. longis reflexo-hirsutis, stipulis oblongis 8 mm. longis 3 mm. latis integris apice acuminatis basi auriculatis peltatim affixis extus hirsutis intus glabris. Racemi 2–3-floriferi longe pedunculati, pedunculis 5–6 cm. longis reflexo-hirsutis, rachibus racemi 2–3 mm. longis, rachibus fasciculorum plus minus nodiformibus, pedicellis florum 2–3 mm. longis. Calyx obconico-campanulatus  $3\frac{1}{2}$  mm. longus 4–5 mm. latus glaber margine ciliolatus apice 5-lobatus, lobis superioribus fere toto connatis apice rotundatis, lobis cæteribus triangularibus 2 mm. longis totiusque latis apice obtusis margine ciliolatis intus hirsutis. Petala 5: vexillum latissime rotundatum 22 mm. latum 10 mm. longum apice emarginatum basi late breveque unguiculatum utroque latere unguis minute appendiculatum; alæ oblique obovatæ valde concavæ 12–15 mm. longæ 10 mm. latæ apice rotundatæ basi recurvæ unguiculatæ, unguibus 2 mm. longis latere superiore 1-appendiculatæ; carinæ circulari-falcato-



Fig. 18; a style of *Phaseolus Mungo* LINN.



lunulatae 5 mm. latae apice truncatae basi unguiculatae, unguibus 3 mm. longis 1 mm. latis. Stamina diadelpa, antheris ovatis  $\frac{1}{2}$  mm. longis. Ovarium lineare 6 mm. longum  $\frac{2}{3}$  mm. latum hirsutum complanatum, stylo  $1\frac{1}{2}$  cm. longo spiraliter recurvo sursum latere interiore hirsuto, stigmate laterali, partibus supra stigma 1–2 mm. longis subulatis. Legumen lineare 6–7 cm. longum 4 mm. latum minute hirsutum scaberrimum.

*Vigna reflexopilosa* HAYATA Gen. Ind. Fl. Formos. p. 22.

HAB. Kelung, Ako, Kwarengo, Suisha.

NOTE: Standard pale-yellow, more or less purple on the back.

**Phaseolus heterophyllus** HAYATA sp. nov. Scandentissima gracilis, caulis teres reflexo-pilosus. Folia alterna 3-foliolata, foliolo terminali ovato-rhomboideo usque ad lanceolato 2 cm. longo  $1\frac{1}{2}$  cm. lato apice triangulari-acuto basi late triangulari-acuto vel obtuso integro membranaceo 3-nervio utraque pagine tenuissime hirsuto, foliolis lateralibus obliquis terminali conformibus, petiolulis 1–2 mm. longis hirsutis, petiolis communibus  $2\frac{1}{2}$  cm. longis, stipellis lanceolatis  $2\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice cuspidato-acuminatis, stipulis oblongis  $3\frac{1}{2}$  mm. longis  $1\frac{1}{4}$  mm. latis apice obtusis basi rotundatis supra medium peltatim affixis margine ciliatis. Racemi axillares solitarii longe pedunculati apice 2–3-floriferi, pedunculis 7–8 cm. longis reflexo-pilosis, pedicellis 1 mm. longis hirsutis apice bracteolis duabus instructis, bracteolis lanceolatis acuminatis hirsutis 4 mm. longis 1 mm. latis margine ciliolatis. Calyx obconico-campanulatus  $3\frac{1}{2}$  mm. longus 3 mm. latus glaber apice 5-lobatus, lobis superioribus toto connatis apice obtusissimis, lobis lateralibus late brevique triangularibus 1 mm. longis  $1\frac{1}{2}$  mm. latis, lobo infimo longe triangulari  $1\frac{1}{2}$  mm. longo 1 mm. lato, lobis totis margine ciliolatis. Petala 5: vexillum late rotundatum 1 cm. longum  $1\frac{1}{2}$  cm. latum apice emarginatum basi leviter cordatum brevissime unguiculatum, ungue 1 mm. longo, utroque latere unguis appendiculatum; alae obovatae unguiculatum cum unguibus 9 mm. longae 5–6 mm. latae apice basi cuneatae breve unguiculatae latere superiore appendiculatae; carinae circulari-falcato-lunulatae 9 mm. longae 3–4 mm. latae apice truncatae intus sursum plus minus hirsutae basi cuneato-unguiculatae, unguibus 2 mm. longis. Stamina diadelpa, tubo filamentorum rubro-striato, antheris oblongo-ovatis  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis apice obtusis basi cordatis. Discus multilobatus, lobis digitiformibus. Ova-



rium lineare 5 mm. longum  $\frac{1}{2}$  mm. latum tenuiter hirsutum, stylo 2 cm. longo spiraliter recurvo sursum latere uno reflexo-hirsuto, stigmatate latere apicis styli insito apice appendiculato, appendice subulato  $\frac{1}{2}$  mm. longo. Legumen lineare 4–5 cm. longum 2–2 $\frac{1}{2}$  mm. latum plus minus complanatum scabriusculum; semina.....

*Phaseolus trilobus* HAYATA Gen. Ind. Fl. Formos. p. 21, (non ART.)

HAB. Kelung, Tōyen, Kwarenkō, Suō, Hikaku, Taitō. Shizangan, Tamsui.

Remarkable for its small and heteromorphous leaflets.

***Phaseolus rotundifolius*** HAYATA sp. nov. Scandentissima humilis basi suffrutescens; caulis subrepens teres retrorsum hirsutus. Folia alterna 3-foliolata, foliolo terminali ovato-rotundato 13 mm. longo 11 mm. lato apice late truncato-rotundato basi late cuneato vel obtuso 3-nervio integro apice haud vel vix mucronato supra subtusque tenuissime hirsuto margine ciliolato, foliolis lateralibus terminali conformibus sed minoribus, petiolulis 1 $\frac{1}{2}$  mm. longis hirsutis, stipellis oblongis apice longe cuspidatis 2 mm. longis  $\frac{2}{3}$  mm. latis, petiolis 2 cm. longis triquetris reflexo-hirsutis, stipulis ovato-oblongis 3 mm. longis 1 $\frac{1}{2}$  mm. latis hirsutis ad medium affixis. Racemi apice 1–2-florati, pedunculis 4 cm. longis glabris, pedicellis hirsutis 1–2 mm. longis, bracteolis duabus basi floris dispositis hirsutis. Calyx campanulatus 3 mm. longus 4 mm. latus glaber margine ciliolatus 5-lobatus, lobis superioribus fere connatis apice rotundato-obtusis, lobis lateralibus late triangularibus 1 mm. longis 1 $\frac{1}{2}$  mm. latis obtusis margine ciliolatis. Petala 5: vexillum late rotundatum 1 cm. latum 7 mm. longum apice emarginatum basi breve unguiculatum utroque appendiculatum margine integrum; alæ obovatæ 7–8 mm. longæ 6 mm. latæ apice rotundatæ basi recurvæ cuneatæ unguiculatæ latere superiore appendiculatæ, unguibus 1 $\frac{1}{2}$  mm. longis; carinæ falcato-lunulatæ (ungue excepto) 9 mm. longæ 3 mm. latæ apice truncatæ, ungue lineari 2 mm. longo  $\frac{1}{2}$  mm. lato plus minus tortuoso. Stamina diadelphe, antheris oblongis  $\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis. Ovarium lineare latere complanatum 5 mm. longum  $\frac{1}{2}$  mm. latum tenuiter hirsutum, stylo latere plus minus complanato lineari-filiformi apice subulato infra apicem a loco 1 mm. ab apice distante usque ad locum 2–3 mm. longum barbato, cæterum glabro. Discus digitiformis. Legumen lineare subteres 3 $\frac{1}{2}$  cm. longum 3–4 mm. latum apice acutum basi

obtusum subglabrum.

**Phaseolus trilobus** AIT.; BAKER in HOOK f. Fl. Brit. Ind. II. p. 201;  
WIGHT Ic. t. 94.

*Vigna stipulata* HAYATA Gen. Ind. Fl. Formos. p. 22.

HAB. Dakusui, Tainan.

*Vigna* SAV.

**Vigna acuminata** HAYATA sp. nov. Caulis scandentissimus volubilis teres pilosus, pilis retrorsis. Folia alterna 3-foliata, foliolis fere conformibus, terminali lanceolato 6-7 cm. longo  $1\frac{1}{2}$  cm. lato apice acuminato ad summum breve aristato basi cuneato-acuto margine integro supra minus subtus plus hirsuto, lateralibus basi plus minus obliquis, petiolulis 2 mm. longis hirsutis, stipellis oblongo-triangularibus 1-2 mm. longis hirsutis, petiolis 3-4 cm. longis reflexo hirsutis, stipulis oblongo-triangularibus 3 mm. longis hirsutis. Racemi axillares-longissime pedunculati, pedunculis 25 cm. longis glaberrimis erectis rectis vel recurvis ascendentibus, partibus floriferis 2-3 cm. longis, pedicellis 2 mm. longis hirsutis. Calyx late campanulatus 8 mm. latus 5 mm. longus 5-lobatus, lobis superioribus fere toto connatis obtusissimis, lobis lateralibus late triangularibus 2 mm. longis totiusque latis obtusis margine ciliolatis extus glabris intus pubescentibus, lobo infimo elongato-triangularibus 3 mm. longis acuminatis. Petala 5: vexillum late rotundatum 13 mm. longum 18 mm. latum apice emarginatum basi cordatum basi breve unguiculatum utroque latere basis breve appendiculatum extus glabrum intus basi minute hirsutum basi apice unguis transversum carinatum; alæ cuneato-obovatae 15 mm. longæ 6-7 mm. latæ apice rotundatae basi gradatim cuneatae latere superiore prope basin 1-appendiculatae; carinae oblique semi-triangulares 13 mm. longæ 10 mm. latæ apice obtusæ basi breve unguiculatae, ungue 3 mm. longo. Stamina diadelphea, antheris ovato-oblongis. Ovarium lineare 10 mm. longum 1 mm. latum dense hirsutum latere complanatum, stylo  $1\frac{1}{2}$  cm. longo medio reflexo-tortuoso sursum latere uno hirsuto, stigmate laterali. Legumen lineare dense hirsutum.

HAB. Taihoku, Sōzan, Taitō.

Near *V. luteola*; but differs from it in the hirsute lanceolate leaflets.



*Dolichovigna* HAYATA n. g.

***Dolichovigna formosana*** HAYATA sp. nov. (Pl. III.) Scandentissima volubilis; caulis gracilis teres 1 mm. in sectione fulvo-villosus remote foliatus sursum versus apicem cirriformis. Folia alterna remote disposita trifoliata, foliolo terminali rhomboideo-ovato-oblongo 8 cm. longo 4 cm. lato apice attenuato obtuso basi rotundato margine subintegro utraque pagine tenuiter villosus, venis venulis subtus distincte elevatis, subtrinervio, foliolis lateralibus terminali conformibus oppositis basi valde obliquis, petiolulis 3 mm. longis stipellis minutis 1 mm. longis subulatis, petiolis communibus 3-4 cm. longis villosis, stipulis minutis elongato-triangularibus 2 mm. longis. Racemi axillares cum pedunculis 7-8 cm. longi, pedunculis 2 cm. longis, dense villosi, floribus geminatis fasciculatis approximatis dispositis, fasciculorum rhachi globosa  $1\frac{1}{2}$  mm. in diametro basi bracteis minutis triangularibus singulis hirsutis  $\frac{1}{2}$  mm. longis instructa, pedicellis ultimis  $2\frac{1}{2}$  mm. longis fulvo-tomentosis, bracteolis duabus utraque latere basis floris dispositis 1 mm. longis ovato-triangularibus hirsutis. Calyx campanulatus 6 mm. longus fulvo-hirsutus obliquus usque ad medium 5-lobatus, lobis elongato-triangularibus 4 mm. longis 3 mm. latis apice acuminatis intus breve villosis, lobis superioribus toto connatis. Petala 5: vexillum late ovato-rotundatum 12 mm. longum 15 mm. latum apice leviter emarginatum basi tenuiter cordatum breve unguiculatum; alae quadrangulariformes 6-7 mm. longæ 3 mm. latæ basi longe unguiculatæ, unguibus 3 mm. longis  $\frac{1}{2}$  mm. latis, utroque latere appendiculatæ, appendiculis 1- $1\frac{1}{2}$  mm. longis interiore recurvis; carinæ falcato-recurvæ basi longe unguiculatæ, laminæ 10 mm. longæ 5 mm. latæ apice attenuatæ superiore recurvæ basi latere superiore plus minus late appendiculatæ, unguibus linearibus 7 mm. longis  $\frac{3}{4}$  mm. longis. Stamina 10 diadelpha, filamentis connatis glabris, antheris ellipticis 1 mm. longis  $\frac{1}{2}$  mm. latis utroque emarginatis. Ovarium hirsutum 10 mm. longum 1 mm. latum latere complanatum apice gradatum attenuatum falcato-recurvum, stylo 7-8 mm. longo infra apicem loco ab apice 1 mm. distant fasciculo pilorum instructo, stigmate truncato. Legumen lineare teres plus minus complanatum dense ferrugineo-villosum 7-8 cm. longum 7 mm. latum apice acutum breve rostratum intus septatum. Semina



cylindrica 4-5 mm. longa 3 mm. lata utroque truncata nitida fusco-purpurascens.

HAB: Kiūkyokudō, leg. Y. MATSUDA; Takao; Tainan; Bantan, (Ako).

The present new genus is undoubtedly referable to the tribe *Phaseoleæ*, as defined by BAKER, BENTHAM and HOOKER, and TAUBERT. As the style has a hair-tuft just below the stigma on the inner side, it should be assigned to the subtribe *Euphaseoleæ*. It is near to *Dolichos* in the terminal stigma; but differs from it in having a hair-tuft just below the stigma on the inner side, in the tumid nodes of the racemes which are exactly like those of *Galactia* and *Pueraria*, and in having nearly terete pods with septas inside. It is comparable to some extents to *Phaseolus*, *Vigna*, *Pueraria*, *Canavalia* and *Galactia* in this point or that; from *Phaseolus*, it differs in the not spirally recurved keel, in the terminal stigma with hair-tuft on one side below it, and in the tumid nodes of the racemes; from *Vigna*, in the terminal stigma and in the tumid nodes of the racemes; from *Pueraria*, *Canavalia* and *Galactia*, in the hair-tuft below the stigma.

**Dolichovigna rhombifolia** HAYATA sp. nov. Scandentissima volubilis; caulis teres gracilis dense villosus remote foliatus versus apicem efoliatus cirriformis. Folia alterna 3-foliata, foliolo terminali rhomboideo-ovato-rotundato  $3\frac{1}{2}$  cm. longo 3 cm. lato apice triangulari-acuto ad summum aristato basi late truncato vel rotundato margine integro supra subtusque tenuiter pubescenti, venis venulis subtus distincte elevatis, foliolis lateralibus minoribus basi valde obliquis, petiolulis 2-3 mm. longis hirsutis, stipellis subulatis 1 mm. longis, petiolis communibus 2-3 cm. longis villosis, stipulis elongato-triangularibus 2 mm. longis hirsutis. Racemi breves 3-5 mm. longi pauciflorati, axillares, rhachi fasciculorum nodiformi, pedicellis 1-2 mm. longis hirsutis, bracteolis duabus basi floris dispositis triangularibus hirsutis 1 mm. longis. Calyx oblique campanulatus hirsutus 4 mm. longus totiusque latus 5-lobatus, lobis superioribus connatis obtusis, lateralibus late triangularibus 2 mm. longis  $1\frac{1}{2}$  mm. latis obtusis hirsutis; lobo infimo elongato-triangulari 3 mm. longo apice obtuso extus hirsuto intus villosus. Petala 5: vexillum late reniformi-cordatum 1 cm. longum  $1\frac{1}{2}$  cm. latum apice emarginatum basi cordatum, ungue 2 mm. longo; alæ quadrangulariformes 6 mm. longæ 3 mm. latæ, ungui-

bus linearibus 3 mm. longis  $\frac{1}{2}$  mm. latis, laminæ basi utroque appendiculatæ lineares; carinæ falcato-lunulatæ, laminæ 1 cm. longæ 4 mm. latæ apice obtusæ; unguibus 8 mm. longis  $\frac{1}{2}$  mm. latæ linearibus. Ovarium lineare 9 mm. longum  $1\frac{1}{2}$  mm. latum fulvo-hirsutum latere complanatum, stylo filiformi 10 mm. longo glabro, infera apicem loco 1 mm. ab apice distante fasciculo pilorum instructo, apice truncato stigmatoso.

HAB. Karapin, leg. S. SASAKI, Dec. 1911.

Near *Dolichovigna formosana* HAY.; but differs from it in the much smaller rhomboid leaflets.

### *Dolichos* LINN.

**Dolichos Lablab** LINN. var. **dolichocarpa** HAYATA n. v. Legumen lineari-cultriforme 7–9 cm. longum 12–15 mm. latum latere complanatum apice acuminatum, acumine rostrato, rostro deorsum recurvo.

HAB. Taihoku et Tōyen, cult.; differs from the type by the much longer pods with recurved beaks.

### *Cæsalpinia* LINN.

**Cæsalpinia Sappan** LINN.; BAKER. in HOOK. f. Fl. Brit. Ind. II. p. 255; DUNN et TUTCHER Fl. Kwangt. and Hongk. p. 89.

HAB. Tōkō, leg. T. SŌMA, 1915.

**Cæsalpinia sepiaria** ROXB.; BAKER in HOOK. f. Fl. Brit. Ind. II. p. 255; DUNN et TUTCHER Fl. Kwangt. and Hongk. p. 89.

HAB. Gaogan, leg. Y. SHIMADA, Juni. 1918.

### *Albizzia* DURAZZ.

**Albizzia longepedunculata** HAYATA sp. nov. Rami fuscentes leviter pubescentes verrucoso-lenticellati. Folia pubescentia bi-paripinnata in ambitu rotundata cum petiolis 15 cm. longa 4–6 juga, pinnis pinnatis superioribus longioribus oppositis in ambitu linearibus 10 cm. longis 3–4 cm. latis, pinnulis 6–9-jugis oppositis sessilibus superioribus majoribus oblongo-linearibus 27 mm. longis 8–9 mm. latis apice obtusissimis basi valde oblique truncatis integris utroque tenuissime hirsutis, petiolulis pinnarum 1 cm. longis

basi incrassatis, petiolis communibus 4–5 cm. longis medio 1-glandulatis, glandulis oblongis adnatis. Flores capitulati, capitulis axillaribus simplicibus longe pedunculatis, pedunculis 4 cm. longis breve villosis, floribus breve pedicellatis, pedicellis 2–3 mm. longis hirsutis. Calyx tubuloso-campanulatus 2 mm. longus  $1\frac{1}{2}$  mm. latus tenuiter hirsutus intus glaber. Corolla elongato-tubuloso-campanulata 6–7 mm. longa 3 mm. lata extus hirsuta intus glabra supra medium sursum 5-lobata, lobis elongato-oblongis 3 mm. longis 1 mm. latis apice acutis vel obtusis. Stamina  $\infty$  basi monadelphæ cum tubo filamentorum 3 cm. longa, antheris reniformibus  $\frac{1}{4}$  mm. longis  $\frac{2}{3}$  mm. latis. Ovarium fusiforme 3 mm. longum  $\frac{1}{2}$  mm. latum glabrum, stylo filiformi glabro. Legumen lineare 10 cm. longum 2 cm. latum apice obtusum basi ad stipitem 1 cm. longum attenuatum valde complanatum glabrum.

*Albizia Lebbek*, HAYATA Gen. Ind. p. 17, (non BENTH).

HAB. Byōritsu: Taiko, leg. B. HAYATA et U. MORI, Juli. 1918.

Near *A. Lebbek* BENTH.; but differs from it by the axillary nearly solitary long-pedunculate heads with much smaller flowers.

## Rosaceæ.

### *Spiræa* LINN.

*Spiræa tarokoensis* HAYATA sp. nov. Frutex; rami et ramuli graciles glabri fusco-purpurascens. Folia alterna chartacea ea ramuli annotini majora rhomboideo-obovata  $2\frac{1}{2}$  cm. longa 2 cm. lata apice obtusissima basi late cuneata vel obtusa margine grosse cuneata ad apicem crenarum apiculata vel paucè serrata supra glabra subtus pallidissima ad venas venulasque tenuiter hirsuta, ea ramulorum hornotinorum minora  $1\frac{1}{2}$  cm. longa 8 mm. lata, petiolis 3–5 mm. longis hirsutis. Flores quasi-umbellati, umbellis ad apicem ramulorum hornotinorum hirsutis terminaliter sitis 15–20-floratis, pedicellis 1 cm. longis gracillimis. Calyx glaber rotato-obconicus, cupula  $1\frac{1}{2}$  mm. in diametro extus glabra intus hirsuta, lobis 5 triangularibus 1 mm. longis totiusque latis margine erosis apice acutis extus glabris intus hirsutis. Petala 5 late rotundata 2 mm. longa 3 mm. lata apice emarginata basi rotundata subito contracta utraque glabra. Stamina circ. 20, ad marginem cupulæ 1-seriatim disposita, filamentis glabris.



2 mm. longis, antheris reniformibus  $\frac{1}{4}$  mm. longis glabris; staminodia (vel glandulæ) circ. 10, antheriformibus sessilibus oblongis  $\frac{1}{4}$  mm. longis. Carpella 5 ad centrum cupulæ calycis disposita; ovariis semi-ovatis hirsutis, stylis glabris 1–1½ mm. longis.

HAB. Taroko, leg. B. HAYATA et S. SASAKI, Aprili. 1917.

Near *Spiræa nipponica* MAXIM.; but differs from it in the much shorter racemes nearly contracted to umbels, and in the leaves which are more or less serrate.

### *Photinia* LINDL.

***Photinia ardisiifolia*** HAYATA Gen. Ind. Fl. Formos. p. 23.

Closely resembles *Photinia prunifolia* LINDL., collected in Hongkong by myself; but distinguishable from it in the much longer leaves with no distinct reticulation of veinlets on the under side.

### *Filipendula* LINN.

***Filipendula kiraishiensis*** HAYATA sp. nov. (Fig. 19). Perennis; rhizoma repens lignosum. Caulis subtetragonus glaber purpureo-rubescens basi et secus longitudinem foliifer. Folia pinnata, basilaria in ambitu obovato-spathulata cum petiolis 10 cm. longa 3½ cm. lata basi attenuata imparipinnata, pinna terminali in ambitu pentagona 3 cm. longa 3½ cm. lata 5-lobata, lobis basilaribus minoribus, lobo terminali majore, apice caudato-cuspidatis margine argute duplicato-serrulatis supra glabris subtus ad costas et venasque hirsutis, costis venisque supra impressis subtus elevatis, reticulis venularum utraque pagine impressis; pinnis lateralibus 3–4 jugis, superioribus majoribus 1½ cm. longis, inferioribus minoribus, infimis ad auriculas minutas reductis, petiolis glabris 2½ cm. longis basi utroque latere stipulis adnatis instructis, stipulis membranaceis 1 cm. longis acuminatis; foliis caulinis minoribus, superioribus sessilibus. Flores cymosi, cymis terminalibus, ramulis divaricatis tenuiter hirsutis, pedicellis 5–10 mm. longis. Calyx glaber, cupula obconico-plana glabra, lobis 5 triangulari-oblongis glabris 1 mm. latis 1½ mm. longis apice obtusis. Petala oblongo-rotundata 3½ mm. longa 2½ mm. lata apice rotundata basi valde contracta breve unguiculata, unguibus  $\frac{1}{4}$  mm. longis totiusque latis



FIG. 19; *Filipendula kiraishiensis* HAYATA; 1, the plant; 2, a flower; 3, a petal; 4, a stamen; 5, calyx with carpels; 6, a carpel.

glabris. Stamina circ. 10 ad marginem calycis cupulæ inserta, filamentis filiformibus 3 mm. longis glabris, antheris reniformibus  $\frac{1}{2}$  mm. longis utrinque emarginatis. Carpella circ. 10 semioblunga 1 mm. longa glabra latere valde complanata, stylo ab apice ovarii oriundo 1 mm. longo glabro, stigmate terminali.

HAB. Kiraishi, ad 10,000 ped. alt., leg. S. ŌHASHI, Aug. 1918.

Near *F. multijuga* MAX.; but differs from it in the much smaller leaves.

## Cucurbitaceæ.

### *Thladiantha* BUNGE.

***Thladiantha formosana*** HAYATA Fl. Mont. Formos. p. 100; Gen. Ind. Fl. Formos. p. 31. Descriptio aucta: Fructus baccatus globosus  $3\frac{1}{2}$  mm. longus totiusque latus setuloso-hirsutus  $\infty$ -spermus. Semina ovata 5 mm. longa  $3\frac{1}{2}$  mm. lata apice obtusa basi rotundata dorso complanata; testa crustacea.

HAB. Holisha, leg. T. KAWAKAMI, Dec. 1913.

## Caprifoliaceæ.

### *Sambucus* TOURN.

***Sambucus formosana*** NAKAI in Bot. Mag. (Tōkyō) XXXI. p. 211

*Sambucus javanica* HAYATA Gen. Ind. p. 34, (non BLUME).

### *Viburnum* LINN.

***Viburnum Matsudai*** HAYATA sp. nov. (Fig. 20). Frutex, ramuli validiusculi rugosissimi deorsum glabri sursum dense villosi. Folia ad apicem ramulorum hornotinorum dua oppositim disposita chartacea ovato-oblonga 4–5 cm. longa 15–22 mm. lata apice caudato-acuminata basi obtusissima vel rotundata margine argute serrata, serris triangularibus rectis ascendentibus acutis, supra minus subtus plus dense villosa, costis et venis supra impressis subtus elevatis, venis lateralibus rectis haud vel rarius furcatis ad apicem serrarum attingentibus, petiolis villosis brevissimis 2–3 mm. longis, stipulis minutis hirsutis subulatis ad basin petiolorum adnatis, glandulis singulis utroque latere basis foliorum subtus dispositis punctiformibus. Fructus cymosi, cymis





Fig. 20; *Viburnum Matsudai* HAYATA; 1, a branch; 2, a drupe; 3, apical portion of the same; 4, 5, a pyrene, seen from different sides; 6, cross section of the same.

ad apicem ramulorum propriorum terminalibus; drupæ oblongæ 6 mm. longæ 4 mm. latæ stellato-hirsutæ; pyrenis oblongis dorso complanatis facie concavis vel planis dorso convexis.

HAB. Rarazan, leg. Y. MATSUDA, Juli. 1918.

Near *Viburnum crosnum* THUNB.; but differs from it in the villose leaves with a long tail at the apex.

**Viburnum melanophyllum** HAYATA Ic. Pl. Formos. IV. p. 13, t. II. Descriptio aucta:—Frutex, ramis valde divaricatis. Folia adulta opposita chartacea ovato-cordata 8 cm. longa 6 cm. lata apice acuta vel breve cuspidato-acuta basi leviter cordata margine serrulata supra in exsiccato fusco-fulvescentia subtus pallidissima utraque pagine subglabra ad nervos venasque pubescentia. Flores fere albi sed dorso plus minus rubescentes. Cymæ fructiferæ ad apicem ramulorum terminales umbellatim dispositæ. Drupa ellipsoidea in exsiccato sicca 6 mm. longa 4½ mm. lata plus minus complanata apice stylo conico et calycis lobis coronata glabra nigricans 1-locularis, endocarpio cartilagineo, 1-sperma; semina elliptica 6 mm. longa 3½ mm. lata apice apiculata basi obtusa facie profunde sulcata, testa membranacea rubescenti, albumine carnosio ruminanti.

HAB. Taiheizan, leg. B. HAYATA et S. SASAKI, Mai. 1917; Rarasan, leg. Y. MATSUDA, 1918.

**Viburnum morrisonense** HAYATA (Fig. 21) Mater. Fl. Formos. p. 133. Descriptio aucta:—Frutex. Cymæ ad apicem ramulorum lateralium terminales 3-4-aggregatæ 3-4 cm. longæ 5 cm. latæ umbelliformes, pedicellis ultimis 3-5 mm. longis stellato-hirsutis. Calyx stellato-hirtellus, tubo (cum ovario) 1 mm. longo ⅔ mm. lato, lobis 5 ovato-rotundatis triangularibus ½ mm. longis apice acutis vel rotundatis plus minus ciliolatis. Corolla rotata alba glabra 5 mm. in diametro 5-lobata, lobis rotundatis 2 mm. longis totiusque latis apice rotundatis basi contractis margine minute erosis glabris. Stamina 5, tubo corollæ affixa, filamentis liberis 2-3 mm. longis glabris, antheris oblongo-rotundatis ⅔ mm. longis apice emarginatis basi tenuiter lobatis. Stylus conicus cum stigmate 1 mm. longus, stigmate 2-3-sulcato.

HAB. Taiheizan, leg. B. HAYATA et S. SASAKI, Mai. 1917.



Fig. 21; *Viburnum morrisonense* HAYATA; 1, a branch; 2, a flower; 3, corolla, expanded; 4, a portion of the margin of the same corolla; 5, 6, a stamen, seen from different sides; 7, ovary; 8, a hair of the ovary; 9, a pyrene; 10, cross section of the same.



**Viburnum taihasense** HAYATA sp. nov. (Fig. 22). Frutex; rami et ramuli glabri subrecti fusco-purpurascens. Folia ad apicem ramulorum hornotinorum oppositim duo disposita membranacea vel tenuiter chartacea oblongo-ovata 6 cm. longa  $3\frac{1}{2}$  cm. lata apice subito cuspidato-acuminata basi rotundata obtusa vel tenuiter cordata margine argute serrata supra subglabra subtus pallida ad venas venulasque tenuiter hirsuta, venis venulisque supra impressis subtus elevatis, petiolis  $1\frac{1}{2}$  cm. longis hirsutis, stipulis subnullis. Cymæ terminales 2–3 cm. longæ totiusque latæ subglabræ vel tenuiter hirsutæ ternatim ramosæ, bracteolis linearibus 2 mm. longis  $\frac{1}{2}$  mm. latis hirsutis, pedicellis ultimis 1–2 mm. longis cum ovario articulatis. Calyx-tubus (cum ovario) obconico-cylindricus  $1\frac{1}{2}$  mm. longus, lobis 5 oblongis subglabris  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis margine ciliolatis. Corolla subrotata 4–5 mm. in diametro, tubo 1 mm. longa 2 mm. lato extus plus minus hirsuto intus glabro, lobis 5 late rotundatis 1 mm. longis  $1\frac{1}{2}$  mm. latis. Stamina 5 basi corollæ affixa, filamentis 2 mm. longis glabris, antheris oblongo-rotundatis  $\frac{2}{3}$  mm. longis glabris. Stylus conicus glaber 1 mm. longus apice 2–3-lobulatus.

HAB. Taihasenzan, ad 10,000 ped. alt., leg. T. ITÔ, Jun. 1915.

Near *Viburnum Wrightii* MIQ., but differs from it in the much more hirsute calyx-tube.

**Viburnum villosifolium** HAYATA sp. nov. Frutex, ramis et ramulis rectis fusco-purpurascens versus apicem tenuiter villosis. Folia opposita lanceolata  $2\frac{1}{2}$ –3 cm. longa 12–15 mm. lata apice gradatim acuminata basi obtusa margine argute serrulata utraque pagine dense stellato-villosa pinnivena, petiolis 1–2 mm. longis, stipulis caducissimis linearibus 1–2 mm. longis castaneis pubescentibus. Cymæ terminales 2 cm. longæ totiusque latæ dense villosæ, bracteis linearibus pilosis 3–5 mm. longis  $\frac{2}{3}$  mm. latis apice obtusis, pedicellis 1– $1\frac{1}{2}$  mm. longis dense stellato-villosis. Calyx-tubus obovoideus plus minus complanatus  $1\frac{1}{2}$  mm. longus dense villosus, limbo alte 5-lobato, lobis oblongo-linearibus  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice obtusissimis vel truncatis extus sparse hirsutis intus glabris margine ciliolatis. Corolla rotata, tubo  $\frac{1}{2}$  mm. longo, extus sparse hirsuta vel glabra, limbo 5-lobato, lobis rotundatis  $1\frac{1}{2}$  mm. longis totiusque latis apice rotundatis basi plus minus contractis margine erosis subintegris. Stamina 5 e basi corollæ oriunda, filamentis 1 mm.

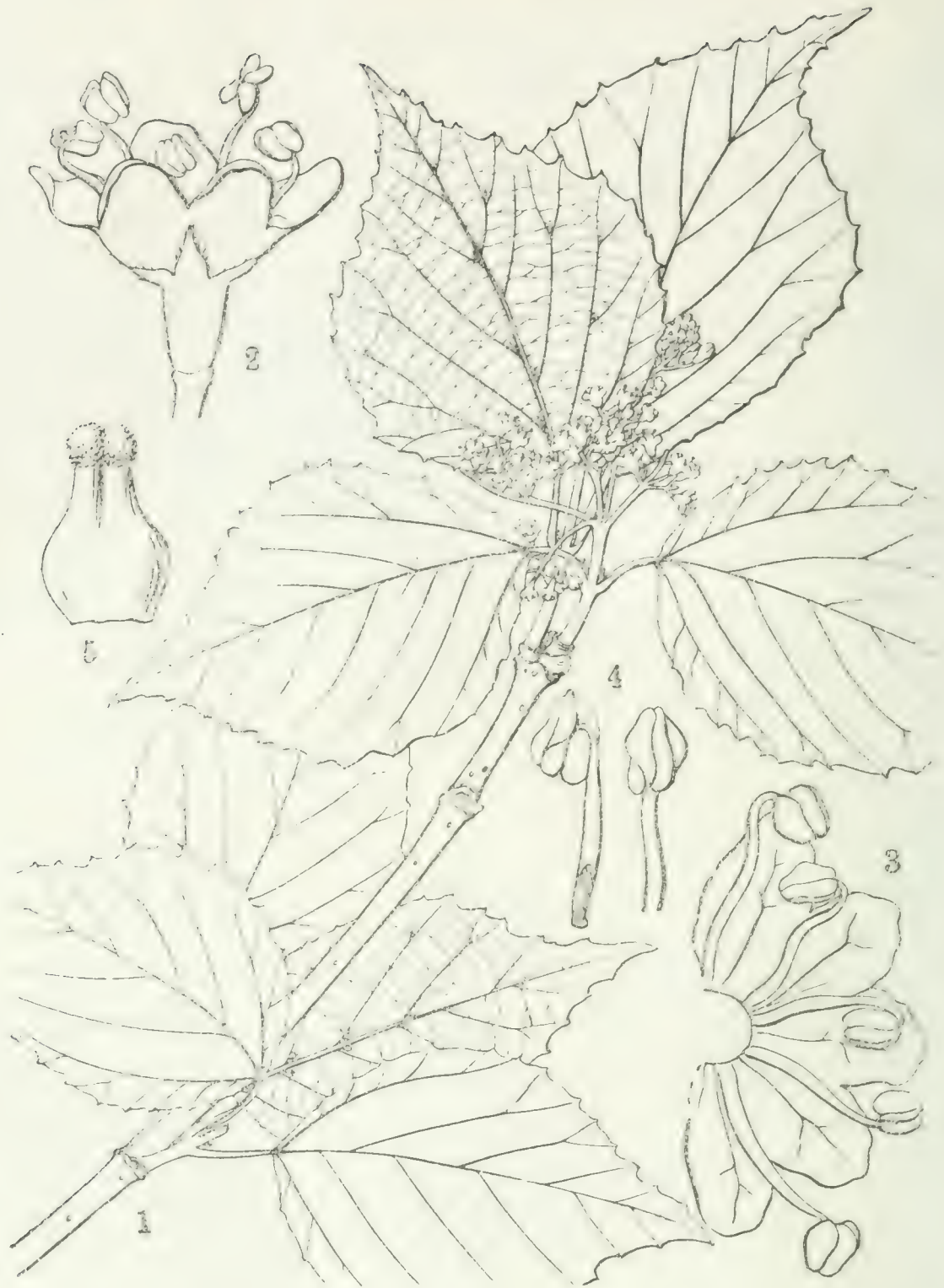


Fig. 22; *Viburnum taihasense* HAYATA; 1, a branch; 2, a flower; 3, corolla, expanded; 4, a stamen, seen from different sides; 5, a style.

longis, antheris reniformibus  $\frac{1}{2}$  mm. latis. Stylus basi conicus apice columnaris  $\frac{1}{2}$  mm. longus apice truncatus.

HAB. Rontabunzan, leg. U. MORI, Aprili. 1910.

Near *Viburnum luzonicum* ROLFE; but differs from it in the much longer linear bracts.

*Lonicera* LINN.

*Lonicera japonica* THUNB. var. *sempervillosa* HAYATA n. v. Frutex scandentissimus, ramis ramulis teretibus molle villosis. Folia opposita tenuiter chartacea ovato-oblonga  $4\frac{1}{2}$ –6 mm. longa  $2\frac{1}{2}$ – $3\frac{1}{2}$  cm. lata apice obtusissima ad summum breve apiculato-acuta basi truncato-rotundata vel tenuiter cordata margine integra supra tenuiter hirsuta subtus dense villosa-velutinosa margine ciliolata, petiolis 8 mm.–10 mm. longis villosis. Flores versus apicem ramulorum axillares solitarii vel geminati, pedicellis 3–5 mm. longis villosis apice flores geminatin gerentibus, floribus sessilibus basi bractea singula bracteolis duabus instructis, bracteis foliis conformibus minoribus, bracteolis oblongis 2 mm. longis apice obtusissimis dense villosis. Calycis tubus (cum ovario) obconico-ellipticus 2 mm. longus totiusque latus basi sparse hirsutus fere glaber, limbo alte 5-lobato, lobis elongato-triangularibus  $1\frac{1}{2}$  mm. longis longe hirsutis. Corolla tubuloso-campanulata extus hirsuta 4–5 cm. longa, tubo 2 mm. lato, limbo 2-labiato, labio superiore late cuneiformi 3 cm. longo  $1\frac{1}{2}$  cm. lato apice truncato basi angustato apice ad medium 4-lobato, lobis spathulato-linearibus 18 mm. longis 4 mm. latis apice obtusissimis, intus (supra) sparse hirsuto extus (infra) dense hirsuto, labio inferiore lineari  $2\frac{2}{3}$  cm. longo 3–4 mm. lato apice obtusissimo extus dense hirsuto intus sparse hirsuto; corollæ tubus intus dense hirsutus. Stamina 5 fauce corollæ affixa, filamentis filiformibus  $2\frac{1}{2}$  cm. longis glabris, antheris linearibus  $2\frac{1}{2}$  mm. longis. Stylus filiformis glaber exsertus  $4\frac{1}{2}$  cm. longus, stigmatе pulviniformi 2-lobato.

*Lonicera japonica* HAYATA Gen. Ind. p. 34, (non THUNB.).

HAB. Shintiku, Taihoku, Kelung.

Near *Lonicera japonica* THUNB.; but differs from it in the leaves which are always thinly hairy above, but densely villose beneath. *L. japonica* has nearly glabrous leaves.

*Lonicera oiwakensis* HAYATA Ic. Pl. Formos. VI. p. 24.

NOTE: Flowers always in pair; calyx green; corolla white, but slightly pink towards the apex; anthers white; styles white, stigma green.



***Lonicera rubropunctata*** HAYATA sp. nov. Frutex scandentissimus, ramis teretibus pilosis, pilis patentissimis, vel villosis. Folia opposita ovato-oblonga 7 cm. longa  $3\frac{1}{2}$  cm. lata apice acuminata ad summum breve aristata basi rotundata vel truncata margine integra supra glabra subtus villosa et rubropunctata tenuiter chartacea, petiolis 5–10 mm. longis villosis. Cymæ axillares vel ad apicem ramulorum terminales, pedicellis 5 mm. longis hirsutis apice flores geminatim gerentibus, bracteis sub flore sessili singulis subulato-lanceolatis 4 mm. longis longe hirsutis intus glabris, bracteolis duabus utroque latere floris dispositis rotundatis utraque pagine glabris margine longo ciliatis  $1\frac{1}{3}$  mm. in diametro. Calycis tubus (cum ovario) oblongus 2 mm. longus  $1\frac{1}{2}$  mm. latus glaber, limbo 1 mm. longo 6-partito, partibus cuspidato-triangularibus margine longe setuloso-ciliatis. Corolla extus tenuiter hirsuta tubuloso-campanulata, tubo 2 cm. longo 2 mm. lato limbo 2-labiato, labio superiore cuneiformi 18 mm. longo 7 mm. lato apice truncato basi attenuato extus sparse hirsuto intus deorsum hirsuto sursum glabro, labio inferiore lineari 18 mm. longo  $1\frac{1}{2}$  mm. lato apice obtusissimo extus sparse hirsuto intus deorsum hirsuto; corollæ tubus intus dense hirsutus. Stamina 5 fauce corollæ affixa, filamentis 2 cm. longis filiformibus glabris, antheris linearibus 4 mm. longis  $\frac{1}{2}$  mm. latis. Stylus filiformis 5 cm. longus glaber apice plus minus dilatatus stigmatate peltato.

HAB. Heirinbi, Giochi, Suisha, leg. B. HAYATA, April. 1916.

Near *L. macrantha* DC., but differs from it in the leaves which are minutely glandular-dotted beneath.

***Lonicera shintenensis*** HAYATA sp. nov. Scandentissima, ramis teretibus tenuiter villosis. Folia opposita ovato-oblonga tenuiter chartacea 6 cm. longa 3 cm. lata apice acuta vel aristato-acuta basi rotundata margine integra supra glabra subtus dense breveque villosa, petiolis dense villosis, stipulis nullis. Cymæ axillares cum pedunculis 2 cm. longis 3 cm. longæ 2 cm. latæ breveque villosæ, bracteis (basi pedicelli) subulato-linearibus dense hirsutis 5 mm. longis basi plus minus dilatatis. Flores ad apicem pedicellorum geminatim dispositi sessiles basi bracteis cuspidato-triangularibus  $1\frac{1}{2}$  mm. longis extus hirsutis intus glabris singulis instructi, bracteolis duabus utroque latere floris dispositis rotundatis  $\frac{2}{3}$  mm. in diametro utraque pagine glabris margine ciliolatis. Calyx-

tubus (cum ovario) obconico-globosus 1 mm. longus glaber, limbo 1 mm. longo usque ad medium 5-lobato, lobis cuspidato-triangularibus circ. 1 mm. longis extus sparse hirsutis intus glabris margine ciliatis. Corolla 12 mm. longa tubuloso-campanulata extus retrorse vel patente hirsuta, tubo circ. 1 mm. lato, limbo 2-labiato, labio inferiore lineari 5 mm. longo 1 mm. lato apice obtusissimo extus hirsuto intus secus medium hirsuto, labio superiore elongato-obtriangulari 7 mm. longo 4 mm. lato extus hirsuto intus deorsum hirsuto sursum glabro 4-lobato, lobis oblongis 2 mm. longis obtusis, tubo corollæ intus dense hirsuto. Stamina 5, fauce tubi corollæ affixa, filamentis incrassatis 2-4 mm. longis glabris, antheris versatilibus dorso medio affixis linearibus  $3\frac{1}{2}$  mm. longis 1 mm. latis utraque extremitate obtusis vel emarginatis. Stylus glaber 12 mm. longus apice plus minus dilatatus truncatus.

HAB. Shinten, leg. B. HAYATA, Mai. 1916.

Near *L. japonica* and *L. affinis*; but readily distinguishable from it in having much smaller flowers.

## Rubiaceæ.

### *Uncaria* SCHREB.

***Uncaria formosana*** HAYATA n. n.

*Ourouparia formosana* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 183, t. XIV.—B.

*Nauclea formosana* MATSUM. in Tokyo Bot. Mag. XIV. p. 127.

***Uncaria Kawakamii*** HAYATA Mater. Fl. Formos. p. 140. Descriptio aucta:—Fructus ad apicem pedunculi capitatum aggregati clavato-fusiformes  $1\frac{1}{2}$  cm. longi 2 mm. lati hirsuti circ. 10-striati 2-loculares  $\infty$ -spermi stipitati, stipitibus 7 mm. longis hirsutis; semina minuta globosa  $\frac{1}{4}$  mm. in diametro minute reticulata ad utramque extremitatem arillis linearibus alæformibus 1 mm. longis instructa.

HAB. Kōtōshō, leg. T. KAWAKAMI et SASAKI, Juli. 1912.

***Uncaria uraiensis*** HAYATA sp. nov. Frutex scandens, rami et ramuli subtetragoni facie late sulcati minute lenticellati plus minus hirsuti. Folia opposita chartacea vel tenuiter coriacea elliptica 12 cm. longa  $6\frac{1}{2}$  cm. lata



apice subito acuminata basi rotundata supra glabra subtus tenuiter hirsuta margine integra, venis supra impressis subtus elevatis, petiolis 8–10 mm. longis. Capitulum florum axillare solitarium pedunculatum, pedunculo 4–5 cm. longo hirsuto medio bracteis duabus oppositis instructo, capitulis globosis 5 cm. in diametro, receptaculo paleaceo dense hirsuto, paleis linearibus. Flores sessiles. Calyx obconico-cylindricus dense villosus-hirsutus 9 mm. longus 3 mm. latus apice 5-lobatus, lobis dense hirsutis elongato-triangularibus 2 mm. longis  $1\frac{1}{2}$  mm. latis. Corolla hypocrateriformis, tubo tubuliformi circ. 1 cm. longo tenuiter hirsuto, limbo patenti 6–7 mm. in diametro 5-lobato, lobis obovato-oblongis 3 mm. longis  $1\frac{1}{4}$  mm. latis apice obtusis intus glabris extus hirsutis. Stamina 5, antheris sessilibus 2 mm. longis apice obtusis basi 2-lobatis, vel stipitibus brevissimis instructis. Stylus longe exsertus 2 cm. longus glaber. erectus rectus apice stigmate claviformi  $3\frac{1}{2}$  mm. longo 1 mm. lato instructus. Ovarium cylindricum 3 mm. longum cum tubo calycis connatum. Fructus capitatum fasciculati, capitulis  $4\frac{1}{2}$  cm. in diametro; capsula sessilis obovoidea 1 cm. longa 5 mm. lata apice obtusissima basi attenuata septicialis 2-cocca  $\infty$ -sperma; seminibus oblongis  $\frac{1}{2}$  mm. longis muricatis ad utramque extremitatem arillis alaformibus linearibus  $1\frac{1}{2}$  mm. longis instructis, arilla alba 2-fida, alba haud fida.

HAB. Uraisha, leg. T. SŌMA et Y. SHIMADA, Aprili. 1915.

*Ourouparia uraiensis* HAYATA in Herb. Taihoku.

HAB. Urai, Remogan.

Near *Uncaria Kawakamii* HAY.; but quite different from it in having much shorter obovoid capsules.

### *Nauclea* LINN.

***Nauclea truncata*** HAYATA Materials for a Flora of Formosa p. 139. Descriptio aucta:—Frutex; folia obovata 20–40 cm. longa 15–20 cm. lata apice rotundata breve cuspidato-acuta ad summum obtusa basi late cuneata ad extremitatem obtusissima subsessilia. Capitulum fructus globosum 3– $3\frac{1}{2}$  cm. in diametro; capsula obconico-cylindrica 1 cm. longa apice 3 mm. lata 2-valvatum loculicidalis; seminibus  $\infty$ , cum alis linearibus 3 mm. longis  $\frac{1}{4}$  mm. latis.

HAB. Inter Busegan et Seisui, leg. B. HAYATA et S. SASAKI, Mai. 1917.



**Nauclea taiwaniana** HAYATA Materials for a Flora of Formosa p. 140. Descriptio aucta:—Capitulum floris globosum 2 cm. in diametro axillare vel breve recensum, racemis terminalibus. Receptaculum globosum dense hirsutum bracteolis vel paleis minutis trabeculiformibus apice clavatis hirsutis 1 mm. longis instructum. Calyx sessilis obconico-cylindricus 2 mm. longus apice 1 mm. latus dense hirsutus, limbo 5-partito, partibus obovatis  $\frac{2}{3}$  mm. longis  $\frac{1}{4}$  mm. latis apice obtusis dense hirsuto-tomentosis. Corolla longe tubulosa 6 mm. longa sursum latior apice 2 mm. lata extus brevissime hirsuta apice 5-lobata, lobis triangularibus obtusis 1 mm. longis vel latis, tubo intus glabro. Stamina 5, limbo corollæ affixa, antheris subsessilibus lanceolatis  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice acutis introrsis basi 2-lobatis. Stylus longe exsertus glaber medio incrassatus apice clavatus. Ovarium inferum.

HAB. Kōshūn : Kankao.

*Cephalanthus* LINN.

**Cephalanthus glabrifolius** HAYATA sp. nov. Frutex? ramuli glabri rubescentes. Folia opposita chartacea oblonga 13 cm. longa 6 cm. lata apice cuspidato-acuta basi rotundata margine subintegra utraque pagine glabra, petiolis  $1\frac{1}{2}$ –2 cm. longis, stipulis interpetiolaribus late triangularibus. Capitulum florum globosum 4–5 cm. in diametro axillare vel terminale solitarium longe pedunculatum, pedunculis 6–7 cm. longis glabris patentibus. Receptaculum capituli florum globosum dense hirsutum paleaceum, paleis (bracteolis) lineari-clavatis 3 mm. longis apice incrassatis hirsutis. Calyx sessilis obconico-tubulosus 3 mm. longus  $1\frac{1}{2}$  mm. latus sursum dense villosus apice 4-dentatus, dentibus brevissimis obtusissimis villosis. Corolla elongato-tubulosa 8 mm. longa glabra basi angustissima sursum latior apice 4-lobata, lobis obovato-rotundatis  $1\frac{1}{2}$  mm. longis  $1\frac{1}{4}$  mm. latis apice obtusissimis basi plus minus contractis extus glabris intus tenuiter hirsutis, glandulis nigris minutis singulis inter lobos dispositis; tubo corollæ extus glabro intus hirsuto. Stamina 4 ad faucem corollæ affixa sessilia, antheris lineari-sagittatis  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis apice acuto-obtusis basi sagittatis. Stylus longe filiformis glaber apice clavato-globoso-dilatatus.

*Cephalanthus naucleoides* (HAYATA) Gen. Ind. p. 34, (pro parte, non DC.).

HAB. Koteisho.

Differs from *C. naucleoides* DC. in having quite glabrous leaves; and from *C. ratoensis*, in the corolla which is hirsute inside and in the glabrous leaves.

**Cephalanthus ratoensis** HAYATA sp. nov. Frutex, ramuli teretes rubescentes tenuissime hirsuti. Folia opposita chartacea oblonga vel ovato-oblonga apice acuta basi rotundata vel truncata 8 cm. longa  $3\frac{1}{2}$  cm. lata supra subglabra subtus tenuiter villosa margine integra, petiolis 8 mm. longis tenuiter hirsutis, stipulis interpetiolaribus late triangularibus apice cuspidatis 3 mm. longis. Capitulum florum globosum 3 cm. in diametro axillare solitarium vel terminale, pedunculo divaricato  $2\frac{1}{2}$  cm. longo. Receptaculum globosum dense hirsutum, paleis (bracteolis) lineari-clavatis dense hirsutis  $1\frac{1}{2}$  mm. longis. Calyx sessilis obconicus 3 mm. longus 2 mm. latus deorsum glaber sursum tenuiter villosus apice 4-lobatus, lobis late triangularibus 1 mm. latis  $\frac{1}{4}$  mm. longis intus dense villosis. Corolla 7 mm. longa tubulosa apice 2 mm. lata extus glabra apice 4-lobata, lobis oblongo-rotundatis  $1\frac{1}{2}$  mm. longis 1 mm. latis apice rotundatis basi haud contractis; corolla intus tenuiter barbata vel subglabra. Stamina 4, infra sinus inter lobos corollæ disposita sessilia, antheris oblongo-linearibus 1 mm. longis apice obtusis basi sagittatis. Glandulæ inter sinus lobi corollæ dispositæ nigris. Stylus filiformis longe exsertus glaber 8 mm. longus apice clavatus.

*Cephalanthus naucleoides* HAYATA (non DC.) in Gen. Ind. p. 34, (pro parte).

HAB. Giranchō: Ratō.

Differs from *C. glabrifolia* in the leaves which are tomentose beneath, and in the corolla which is nearly glabrous inside.

### *Adina* SALISB.

**Adina racemosa** MIQ.; HAYATA Gen. Ind. p. 34.

HAB. Giranchō: Tōō, leg. S. NAKAI; Arisan, leg. G. NAKAHARA.

Flowers being too young, the determination is rather conjectural.

*Dentella* FORST.

**Dentella Matsudai** HAYATA sp. nov. Herba diffusa ramosissima repens. Caulis tetragonus subglaber. Folia opposita spathulata vel oblanceolata 5–6 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa vel opposita basi attenuata ad petiolum abeuntia integra utraque pagine glabra vel setuloso-hirsuta, petiolis subnullis, stipulis interpetiolaribus triangularibus 1 mm. longis totiusque latis glabris. Flores axillares vel terminales solitarii sessiles. Calyx obconico-tubulosus  $2\frac{1}{2}$  mm. longus  $1\frac{1}{2}$  mm. latus apice 5-lobatus basi setulis apice glanduliferis dense obtectus sursum subglaber, lobis longe triangularibus 1 mm. longis  $\frac{1}{3}$  mm. latis acuminatis margine setulosis. Corolla obconico-campanulata 5 mm. longa  $2\frac{1}{2}$  mm. lata glabra apice 5-lobata, lobis triangularibus 1 mm. longis totiusque latis apice acutis, tubo corollæ extus glabro intus tenuiter hirsuto. Stamina 5, infra medium tubi affixa, filamentis filiformibus 1 mm. longis, antheris linearibus  $\frac{1}{2}$  mm. longis. Stylus minutus columnaris  $1\frac{1}{2}$  mm. longus medio sursum 2-lobatus, lobis erectis 1 mm. longis glabris. Ovarium inferum globosum 1 mm. in diametro 2-loculare, loculis  $\infty$ -ovulatis. Fructus capsulares globosi  $2\frac{1}{2}$  mm. in diametro dense glanduloso-setulosi apice tubo calycis coronati. Semina numerosa globoso-angularia  $\frac{1}{4}$  mm. diametro, testis minute reticulatis.

HAB. Ako, leg. Y. MATSUDA, Aprili. 1913.

Near *Dentella repens* FORST; but differs from it in having much smaller leaves and densely barbate fruits.

*Hedyotis* LINN.

**Hedyotis kuraruensis** HAYATA sp. nov. Herba subfruticosa 30–40 cm. alta; caulis tetragonus glaber ad faciem sulcatus. Folia opposita herbacea membranacea in vivo crassiuscula oblonga vel oblongo-ovata apice acuta vel acuminata basi rotundata vel truncata ad extremitatem subito ad petiolum abeuntia margine integra utraque pagine subglabra vel tenuissime hirsuta, petiolis 8 mm. longis adpresse hirsutis, stipulis interpetiolaribus late triangularibus hirsutis 2 mm. longis cuspidatis. Flores ad axillas foliorum densissime fasciculati sessiles, bracteis minutis linearibus 2–3 mm. longis utroque latere



basis lobis triangularibus instructis inter flores intermixtis ciliolatis. Calyx obconico-campanulatus 5 mm. longus 4 mm. latus tenuiter hirsutus, tubo  $1\frac{1}{2}$  mm. longo, limbo 5-lobato, lobis late linearibus 3 mm. longis 1 mm. latis intus glabris extus tenuiter hirsutis. Corolla campanulata extus glabra 4 mm. longa apice prope medium sursum 4-lobata, lobis oblongo-linearibus 2 mm. longis  $\frac{2}{3}$  mm. latis apice obtusis dorso setuloso-hirsutis intus glabris basi haud contractis, corollæ tubo intus hirsuto. Stamina 4, filamentis ultra tubum corollæ exsertis  $\frac{1}{4}$  mm. longis, antheris linearibus 1 mm. longis vel  $1\frac{1}{4}$  mm. latis apice obtusis. Stylus columniformis apice 2-lobatus, lobis oblongis stigmatosis.

HAB. KURARU, leg. B. HAYATA et S. SASAKI, Junii. 1912.

Near *Hedyotis auricularia* W. et ARN. (BENTH. Fl. Hongk. p. 150); but differs from it in having much thinner leaves with very slender, not at all prominent, nerves underneath.

### *Anotis* DC.

***Anotis formosana*** HAYATA sp. nov. Herba basi procumbens sursum ascendens 10–20 cm. longa; glabra gracilis. Folia opposita ovata vel ovato-oblonga chartacea vel membranacea 1– $1\frac{1}{2}$  cm. longa 12 mm. lata apice acuta basi obtusa vel rotundata integra supra hirsuta subtus ad venas tenuiter hirsuta, petiolis 2–3 mm. longis, stipulis late triangularibus 3 mm. longis 2 mm. latis laceratis membranaceis. Flores versus apicem caulis cymose dispositi, bracteis digitiformibus laceratis 1– $1\frac{1}{2}$  mm. longis. Calyx obconico-campanulatus  $2\frac{1}{2}$  mm. longus glaber 2 mm. latus 4-lobatus, lobis oblongo-ovatis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice obtusis glabris. Corolla campanulata 4 mm. longa 3 mm. lata glabra 4-lobata, lobis oblongo-triangularibus  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis. Stamina 4 sessilia, antheris linearibus  $1\frac{1}{4}$  longis  $\frac{1}{4}$  mm. latis. Stylus glaber filiformis 4 mm. longus apice breviter 2-lobatus.

HAB. Bonbonzan, Taiheizan, leg. B. HAYATA et S. SASAKI, Mai. 1917.

NOTE: Leaves green dull, above; corolla white, lobes 3–4; calyx green.

### *Oldenlandia* LINN.

***Oldenlandia diffusa*** ROXB.; Hook. f. Fl. Brit. Ind. III. p. 65; FORBES.

et HEMSLEY. Ind. Fl. Sin. I. p. 377; MATSUMURA Ind. Pl. Jap. II.-2, p. 592.

HAB. Suisha, Shinjō, Kelung.

New to the flora of Formosa.

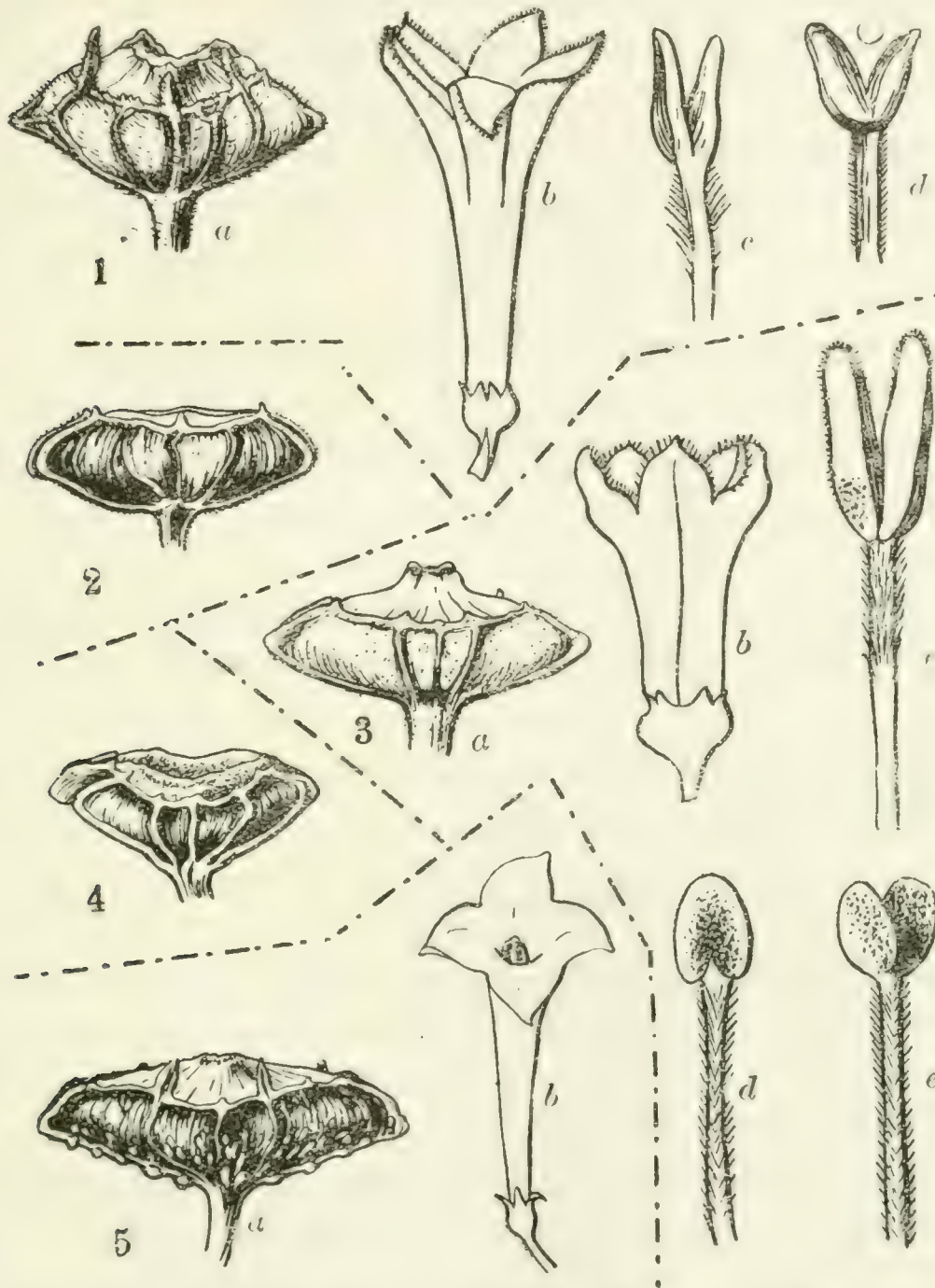


Fig. 23; *Ophiorrhiza* spp.; 1, *O. dimorphantha* HAY.; a, a fruit; b, a flower; c, the stigma of a male flower; d, the stigma of a female flower; 2, *O. inflata* MAXIM.; 3, *O. monticola* HAY.; a, a fruit; b, a flower; c, the stigma of a male flower; d, a stigma of a female flower; e, the same, seen from front; 4, *O. parviflora* HAY.; 5, *O. stenophylla* HAY.; a, a fruit; b, a flower.

*Ophiorrhiza* LINN.

***Ophiorrhiza dimorphantha*** HAYATA (Fig. 23-1) Gen. Ind. p. 36.

HAB. Daitonzan, Agioku, Kelung.

NOTE: Corolla hirsute inside, lobes 5, tube broader; ovary smooth, but hirsute.

***Ophiorrhiza inflata*** MAXIM. (Fig. 23-2) Mélang. Biol. XII. p. 729; MATSUM. Ind. Pl. Jap. II.-2, p. 593.

HAB. Ōchōbi; Urai; Agioku; Shinjō; Taiko; Yeyama.

NOTE: Flowers white glabrous. New to the flora of Formosa.

***Ophiorrhiza monticola*** HAYATA (Fig. 23-3) Gen. Ind. p. 36.

HAB. Arisan, ad 2,500 m. alt.

***Ophiorrhiza parviflora*** HAYATA (Fig. 23-4) Gen. Ind. p. 36.

HAB. Kwashōtō; Kōtōshō; Teraso; Kusukusu.

NOTE: Flowers white.

***Ophiorrhiza stenophylla*** HAYATA (Fig. 23-5) Gen. Ind. p. 36.

HAB. Sōseikyaku; Tōgō et Kamiyodani; Urai; Raga; Agioku, leg. B. HAYATA.

NOTE: Corolla white, lobes 4-5, tube very slender, glabrous within; ovary muricate glabrous.

*Mussaenda* LINN.

***Mussaenda albiflora*** HAYATA sp. nov. Frutex scandens, ramis et ramulis teretibus hirsutis. Folia opposita oblonga 4-5 cm. longa 3-3½ cm. lata apice acuminata basi obtusa vel acuta margine integra chartacea utraque pagine tenuissime hirsuta, petiolis 3-4 mm. longis tenuiter hirsutis, stipulis interstipularibus dense hirsutis 2-partitis, partibus subulato-triangularibus 4-5 mm. longis apice subulatis glabris basi dense hirsutis. Cymæ terminales dense floriferae hirsutæ, bracteis triangulari-linearibus 5 mm. longis hirsutis acuminatis. Flores fere sessiles. Calyx tubiformis cum lobis 6-7 mm. longus 2 mm. latus, tubo 1-2 mm. longo, limbo 5-partito, partibus linearibus erectis subulatis 4-6 mm. longis basi 1 mm. latis extus hirsutis intus glabris. Corolla tubulosa 13-15 mm. longa extus hirsuta, tubo 1 cm. longo 2 mm. lato, limbo



5-lobato, lobis ovatis 3 mm. longis 2 mm. latis apice acuminatis basi contractis integris extus hirsutis intus glabris, limbo fauce densissime albo-barbato, tubo deorsum intus glabro. Stamina 5 fauce tubi affixa, filamentis filiformibus ad tubum affixis, antheris linearibus 2 mm. longis  $\frac{1}{4}$  mm. latis apice obtusis. Stylus glaber 5 mm. longus apice 2-lobatus, lobis  $1\frac{1}{2}$  mm. longis.

HAB. Suisha, leg. B. HAYATA, Mai. 1912.

Near *M. pubescens*, but differs from it in having much shorter anthers and in the nearly sessile flowers. The species is, so far, only found in this region of the island.

### *Chomelia* LINN.

***Chomelia gracilipes* HAYATA sp. nov.** Frutex; rami et ramuli gracillimi glabri, cortice plus minus soluto. Folia opposita membranacea vel tenuiter chartacea obovata vel oblonga 9–13 cm. longa  $3\frac{1}{2}$  cm.– $4\frac{1}{2}$  cm. lata apice caudato-acuminata basi cuneata margine integra supra glabra subtus tenuissime hirsuta vel glabra, petiolis 1– $1\frac{1}{2}$  cm. longis adpresse hirsutis, stipulis interpetiolaribus triangularibus 2 mm. longis glabris. Cymæ terminales gracillimæ 5–6 cm. longæ 10 cm. latæ a basi ternatim ramosæ hirsutæ, bracteis minutis linearibus 2 mm. longis hirsutis, pedicellis gracillimis tenuiter hirsutis bracteolis minutis 1–2 instructis. Calyx tubulosus  $2\frac{1}{2}$  mm. longus  $1\frac{1}{2}$  mm. flatus apice 5-dentatus, dentibus late triangularibus  $\frac{1}{2}$  mm. longis et latis margine erosis, intus inter dentes glandulis instructus cæterum glaber. Corolla hypocrateriformis glabra, tubo 6 mm. longo  $1\frac{1}{2}$  mm. lato extus glabro intus hirsuto, limbo 5-partito, partibus spathulato-linearibus 1 cm. longis 3 mm. latis apice obtusissimis utraque pagine glabris intus basi barbatis ad faucem barbatis. Stamina 5, filamentis  $1\frac{1}{2}$  mm. longis ad sinus inter lobos corollæ affixis glabris, antheris linearibus 1 cm. longis  $\frac{2}{3}$  mm. latis apice obtusis. Stylus 2 cm. longus basi hirsutus sursum glaber incrassatus ad apicem brevissime 2-lobatus, lobis minutis  $\frac{1}{2}$  mm. longis stigmatosis. Ovarium inferum cum tubo calycis connatum 2-loculare, loculis 5–6-ovulatis.

HAB. Akō: Raisha, leg. Y. MATSUDA, No. 1054.

Near *Chomelia attenuata* (HOOK. f.); but differs from it in the very much slender cymes with larger flowers.

**Chomelia kotoensis** HAYATA sp. nov. Arborescens? rami validiusculi. Folia opposita oblongo-obovata 17–22 cm. longa 9–11 cm. lata apice breve cuspidato-acuta basi cuneata margine integra in exsiccatō membranacea vel tenuiter coriacea utraque pagine glabra, petiolis 1–2 cm. longis, petiolis interpetiolaribus basi se connatis tubum brevissimum formantibus apice triangularibus 3–5 mm. longis. Cymæ terminales 10 cm. longæ 15 cm. latæ a basi ramosæ, ramis divaricatissimis glabris, bracteis linearibus 2–3 mm. longis. Flores ignoti. Fructus globosus 1 cm. in diametro glaber. Semina ignota.

HAB. Kōtōshō, leg. K. MIYAKE.

Differs from *C. corymbosa* in having much looser corymbs and in the very much larger obovate leaves.

**Chomelia lancifolia** HAYATA sp. nov. Frutex, rami et ramuli graciles plus minus pubescentes. Folia opposita tenuiter coriacea lanceolata vel oblanceolata 9–10 cm. longa 2–2½ cm. lata apice acuminata basi attenuata margine subintegra utraque pagine glabra, costa supra impressa subtus elevata, venis lateralibus tenuissimis subtus tenuissime elevatis, petiolis 5–6 mm. longis, stipulis interpetiolaribus triangularibus cuspidatis. Cymæ terminales glabræ plus minus pubescentes 6 cm. longæ 10 cm. latæ a basi ternatim ramosæ, bracteis minutis lineari-lanceolatis, pedicellis gracilibus 10 mm. longis adpresso pubescentibus, bracteolis duabus ovatis instructis. Calyx urceolato-tubulosus 3 mm. longus 2 mm. latus apice 5-dentatus, dentibus late triangularibus 1 mm. latis ½ mm. longis margine plus minus hirsutis. Corolla hypocrateriformis, tubo 5 mm. longo 1 mm. lato, limbo 5-partito, partibus patentissimis recurvis spathulato-linearibus 11 mm. longis 3 mm. latis apice obtusissimis basi attenuatis, utraque pagine glabris, tubo corollæ extus glabro intus barbato ad faucem hirsuto. Stamina 5 ad sinus inter lobos corollæ affixa, filamentis brevibus 2 mm. longis glabris, antheris linearibus 10–11 mm. longis apice obtusis basi 2-lobatis. Stylus 1½ cm. longus supra usque ad medium hirsutus apice 2-lobatus vel haud lobatus.

HAB. Hiiranzan, leg. B. HAYATA et S. SASAKI, Juni. 1912.

Near *Chomelia attenuata* (Hook. f.); but distinguishable from it in the pubescent pedicels and peduncles with much larger flowers.



*Randia* LINN.

*Randia sinensis* ROEM.; BENTH. Fl. Hongkong. p. 155; HEMSL. Ind. Fl. Sin. I. p. 382; HAYATA Gen. Ind. p. 36.

HAB. Inter Rōnō et Kōseupo, leg. B. HAYATA, Aprili. 1917.

*Randia suishænsis* HAYATA sp. nov. Frutex vel arborescens. Folia lanceolata vel oblanceolata tenuiter coriacea opposita 8–10 cm. longa  $2\frac{1}{2}$ – $3\frac{1}{2}$  cm. lata apice acuminata basi attenuata margine integra utraque glabra supra nitida, costis venisque supra minus subtus plus elevatis, petiolis 1 cm. longis, stipulis triangulari-cuspidatis 3–4 mm. longis interpetiolaribus. Cymæ versus apicem approximativè paniculatim dispositæ, 3 cm. longæ bracteis oppositis triangulari-cuspidatis  $2\frac{1}{2}$  mm. longis 2 mm. latis coriaceis, pedicellis brevibus hirsutis ad basin calycis articulatis. Calyx glaberrimus tubiformis 4 mm. longus  $2\frac{1}{2}$  mm. latus apice 5-lobatus, lobis triangularibus 1 mm. longis totiusque latis apice acutissimis glabris. Corolla subrotata glabra, tubo 3 mm. longo 2 mm. lato intus glabro, limbo 5-partito, partibus linearibus 9 mm. longis  $2\frac{1}{2}$ –3 mm. latis apice acutis basi haud vel plus minus contractis integris utraque pagine glabris sed intus versus basin ad faucem dense hirsutis. Stamina 5 ad faucem tubi corollæ affixa, filamentis brevissimis 1 mm. longis, antheris linearibus  $7\frac{1}{2}$  mm. longis 1 mm. latis apice acuminatis basi obtusis brevissime 2-lobatis. Stylus columnaris 12 mm. longus glaber incrassatus sursum stigmatosus 5-sulcatus. Fructus ovoideo-globosus 6 mm. longus 5 mm. latus 2-ocularis polyspermus, seminibus liberis ad placentas aggregatis subtriangularibus 2 mm. longis latere complanatis, albuminibus carnosis.

*Randia densiflora* HAYATA (pro parte) Gen. Ind. p. 36 (non BENTH.).

HAB. Suisha, leg. B. HAYATA, Aprili. 1916.

Differs from *R. densiflora* in the corolla which is quite glabrous outside; and from *R. acutidens* in the much shorter corolla-tubes and in the longer corolla-lobes.

*Diplospora* DC.

*Diplospora?* *buisanensis* HAYATA sp. nov. (Fig. 24). Frutex; rami et ramuli validiusculi, cortice gradatim soluto rubro-purpurascenti. Folia opposita



elongato-oblonga vel lanceolata 6-7 cm. longa 2 cm. lata apice acuminata basi attenuata margine integra tenuiter coriacea utraque pagine glabra, petiolis 3-5 mm. longis, stipulis interpetiolaribus late triangularibus coriaceis 3-4 mm.



Fig. 24; *Diprosopa? buisanensis* HAYATA; 1, a branch; 2, a flower; 3, corolla of the same flower, expanded; 4, a stamen, seen from different sides; 5, ovary.

longis. Flores ad cicatrices foliorum lateribus ramulorum fasciculatim breve cymosim dispositi, cymis  $1\frac{1}{2}$  cm. longis tenuiter hirsutis, bracteis oppositis se connatis brevissimis, pedicellis 3 mm. longis. Calyx campanulatus tenuiter hirsutus 2 mm. longus totiusque latus ore circ. integer vel leviter 4-dentatus. Discus pulviniformis supra ovarium dispositus. Corolla campanulata 8 mm. longa extus glabra intus plus minus hirsuta, tubo 3 mm. longo basi 2 mm. lato, 4-lobata, lobis oblongis 6 mm. longis  $3\frac{1}{2}$  mm. latis apice acutis obtusis integris basi haud vel vix contractis. Stamina 4 ad basin lorum corollæ alternatim disposita; filamentis validiusculis brevibus  $1\frac{1}{2}$  mm. longis complanatis tenuiter hirsutis, antheris oblongo-linearibus 3 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi 2-lobatis. Stylus glaber columniformis 4 mm. longus apice 3-lobatus, lobis linearibus. Ovarium inferum 2-loculare, loculis  $\infty$ -ovulatis.

HAB. Buizan, leg. Y. MATSUDA, Aug. 1918.

### *Ixora* LINN.

*Ixora graciliflora* HAYATA sp. nov. Frutex; rami et ramuli cinerascens rugosi. Folia opposita obovato-elliptica chartacea  $6\frac{1}{2}$  cm. longa 2 cm. lata apice obtusa basi obtusissima vel truncata margine integra utraque glabra, costa supra impressa subtus elevata, venis utraque pagine gracilibus tenuiter elevatis, venis lateralibus rectis, petiolis subnullis vel brevissimis, stipulis interpetiolaribus subulato-triangularibus 3 mm. longis 1 mm. latis glabris. Panicula cymosa singulis terminalis, pedunculo 2 cm. longo, pedicellis brevissimis subglabris, bracteolis minutis. Calyx tubulosus  $1\frac{1}{2}$  mm. longus totiusque latus ad orem 4-dentatus subglaber. Corolla hypocrateriformis subglabra, tubo gracili  $2\frac{1}{2}$  cm. longo 1 mm. in diametro erecto subglabro, limbo patenti 4-partito, partibus oblongis 7 mm. longis  $3\frac{1}{2}$  mm. latis apice obtusissimis basi plus minus contractis margine minute hirsutis vel haud hirsutis. Stamina 4 ad faucem tubi corollæ affixa subsessilia, antheris linearibus 4 mm. longis  $\frac{2}{3}$  mm. latis apice acutis basi ad medium 2-partitis. Stylus glaber filiformis tubo corollæ æquilongus apice 2-lobatus, lobis plus minus dilatatis linearibus 3 mm. longis  $\frac{1}{2}$  mm. latis.

HAB. Kwashôtō, leg. T. SŌMA, Juli. 1913.

Near *I. chinensis*, but differs from it in the much smaller leaves and



much slenderer flowers with much narrower lobes.

*Psychotria* LINN.

*Psychotria*? *kotoensis* HAYATA sp. nov. Frutex; rami pallido-cenerecentes glabri cicatricibus foliorum 3-4 mm. in diametro notati. Folia opposita chartaceo-membranacea oblonga 10-15 cm. longa  $4\frac{1}{2}$ -6 cm. lata apice acuta basi cuneato-attenuata margine integra utraque pagine glabra, costis venis utraque pagine tenuissime elevatis, petiolis 3-6 cm. longis, stipulis ignotis. Flores ignoti. Fructus ad apicem caulis aggregati pedicellati, pedicellis 4-5 mm. longis. Bacca oblongo-globosa 1 cm. longa 8 mm. lata apice rotundata 2-cocca.

HAB. Kōtōshō, leg. K. MIYAKE, Nov. 1899.

*Lasianthus* JACK.

*Lasianthus hiiranensis* HAYATA sp. nov. Frutex; rami et ramuli graciles in exsiccato nigricantes hirsuti vel subglabrati. Folia opposita tenuiter coriacea vel chartacea oblonga vel oblongo-obovata 8-9 cm. longa 4- $4\frac{1}{2}$  cm. lata apice subito acuta ad summum aristulata basi obtusissima vel rotundata margine repanda vel subintegra supra glabra subtus hirsuta, petiolis 5 mm. longis hirsutis, stipulis interpetiolaribus subulato-triangularibus 7 mm. longis dense hirsutis. Flores ignoti. Fructus ad axillas foliorum fasciculati hirsuti in exsiccato nigricantes 4-5-cocci. Semina ignota.

HAB. Hiiranzan, leg. B. HAYATA et S. SASAKI, Juni. 1912.

*Psychotria macrophylla* HAYATA sp. nov. Suffrutex scandentissimus prostratus sed ad nodos laud radicantes; rami teretes 4-5 mm. in diametro gaberrimi. Folia opposita chartacea vel tenuiter coriacea obovata 8-10 cm. longa apice triangulari-obtusa vel breve cuspidato-obtusa basi longe attenuata margine integra utraque pagine glabra, costa supra impressa subtus elevata, venis gracilibus utraque elevatis, petiolis 3 mm. longis. Fructus cymosi, cymis terminalibus, bracteis et bracteolis instructis, baccis oblongo-globosis 5 mm. longis 4 mm. latis tenuiter 10-sulcatis, exocarpiis tenuibus, endocarpiis crustaceis, 2-cocciis.

HAB. Bonin: Chichijima, leg. H. HATTORI. 1905.

As the plant bears an aspect remarkably different from that of *P. serpens*, it should be better regarded as a distinct species. The leaves of the new plant are very much larger than those of *P. serpens*, and the branches of the former are scandent and prostrate, but not rooting as is the case with the latter species. I have examined all the specimens of *P. serpens* from Japan, Formosa and Hongkong; but none does ever seem to approach to the Bonin plant in the shape of the leaves and in the habit.



Near *Lasianthus formosensis* MATSUM., but differs from it in having leaves with round base, and in the much longer hirsute stipules.

**Lasianthus microstachys** HAYATA sp. nov. Frutex; rami et ramuli gracillimi subglabri. Folia opposita chartacea vel tenuiter coriacea oblonga 7–10 cm. longa 3 cm. lata apice cuspidato-acuminata basi cuneata vel acuta margine integra supra glabra subtus ad costas venas dense hirsuta, costis venisque supra tenuiter impressis subtus prominente distincteque elevatis, petiolis 3–4 mm. longis hirsutis, stipulis subnullis ad pilos densos reductis. Cymæ paucifloratæ breve pedunculatæ vel subsessiles, axillares 5 mm. longæ vel brevissimæ. Calyx urceolato-campanulatus  $3\frac{1}{2}$  mm. longus 3 mm. latus, tubo  $1\frac{1}{2}$  mm. longo totiusque lato paucè hirsuto cum ovario connato, limbo campanulato extus hirsuto intus glabro a medio sursum 5-lobato, lobis lineari-subulatis  $1\frac{1}{2}$  mm. longis basi dilatatis hirsutis. Corolla ignota. Fructus late globosus 4 mm. latus 3 mm. longus 5-lobatus 5-coccus, exocarpiis carnosis, endocarpiis (testis cocci) crustaceis semi-oblongis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis. Semina ignota.

HAB. Ōchōbi, leg. B. HAYATA, Mai. 1916.

Near *Lasianthus micranthus* HOOK. f. (in Fl. Brit. Ind. III. p. 190); but distinguishable from it in having much smaller leaves with cuneate base.

**Lasianthus parvifolius** HAYATA sp. nov. Frutex; rami et ramuli graciles vel tenuiter hirsuti subtetragoni. Folia opposita tenuiter coriacea vel chartacea 5 cm. longa  $2\frac{1}{2}$  cm. lata apice caudato-acuminata basi acuta vel obtusa integra supra glabra subtus tenuiter hirsuta, petiolis 8 mm. longis hirsutis, stipulis interpetiolaribus 1–2 mm. longis triangularibus hirsutis acutis. Flores ad axillas foliorum fasciculati subsessiles, bracteolis minutis triangularibus hirsutis. Calyx obconicus 3 mm. longus totiusque latus hirsutus, limbo 5-lobato, lobis triangularibus 1 mm. longis totiusque latis acutissimis hirsutis intus glabris. Corolla tubiformis 1 cm. longa 3 mm. latus exta hirsuta apice 5-lobata, lobis oblongis 3 mm. longis 2 mm. latis apice acutis basi haud contractis extus tenuiter hirsutis intus barbatis, tubo intus dense barbato. Stamina 5 subsessilia, antheris linearibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{4}$  mm. latis apice obtusis. Discus pulviniformis supra ovarium inferum insitus. Stylus columniformis glaber 3 mm. longus apice incrassatus tenuiter 5-lobatus.

HAB. Arisan: Inter Taroyen et Funkiko, leg. B. HAYATA, Jan. 1912.

Near *Lasianthus formosensis*, but differs from it in having much smaller leaves and glabrous branches.

*Pæderia* LINN.

***Pæderia uraiensis*** HAYATA sp. nov. Scandens et volubilis; caules et rami teretes fulvo-tomentosi. Folia opposita membranacea vel chartacea ovata oblonga vel lanceolata apice acuminata basi obtusa vel cordata 7–15 cm. longa 2½–10 cm. lata minute eroso-serrulata vel subintegra supra tenuiter subtus dense villosa, petiolis 3–6 cm. longis. Flores paniculati, paniculis axillaribus vel terminalibus 10–12 cm. longis tenuiter villosis, pedicellis hirsutis nullis vel 3–4 mm. longis, bracteolis elongato-triangularibus 2 mm. longis  $\frac{2}{3}$  mm. latis apice 2-lobatis, lobis acutis. Calyx campanulatus 2 mm. longus totiusque latus, limbo 5-lobato, lobis triangularibus 1 mm. longis  $\frac{2}{3}$  mm. latis apice acutis. Corolla tubuloso-campanulata 6–7 mm. longa 3–4 mm. lata intus hirsuta apice 5-lobata, lobis triangularibus 1 mm. longis 1½ mm. latis apice acutis. Stamina 5 tubo corollæ ad altitudines inæquales affixa, filamentis glabris  $\frac{1}{2}$  mm. longis, antheris linearibus 2½ mm. longis  $\frac{1}{4}$  mm. latis. Stylus basi singularis, parte singulari 1 mm. longa, a basi sursum 2-partitus, partibus 4–5 mm. longis filiformibus hirsutis stigmatosis.

HAB. Tōyenchō: Uraisha, leg. S. SASAKI, Nov. 1908.

Near *P. villosa* HAY.; but distinguishable from it in the much smaller flowers and more densely villose leaves.

***Pæderia villosa*** HAYATA sp. nov. Scandens et volubilis; caules et rami teretes glabri. Folia opposita ovata vel oblongo-cordata 6–10 cm. longa 3–6 cm. lata apice caudato-acuminata basi rotundata vel plus minus cordata margine eroso-serrulata chartacea supra tenuiter subtus dense villosa, venis costisque supra minus subtus plus elevatis gracilibus, petiolis 3 cm. longis glabris. Flores laxè paniculati, paniculis terminalibus 30–40 cm. longis subglabris, pedicellis brevibus vel nullis. Calyx campanulatus 2 mm. longus glaber totiusque latus, limbo 5-lobato, lobis triangularibus 1 mm. latis  $\frac{1}{2}$  mm. longis obtusis. Corolla tubulosa 8–9 mm. longa 2½ mm. lata apice 5-lobata, lobis triangularibus 1 mm. longis obtusis, tubo intus hirsuto basi fasciulis



pilorum instructo. Stamina 5 tubo corollæ affixa, filamentis brevibus, antheris linearibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis. Stylus 7–8 mm. longus glaber alte 2-fidus. Discus obconicus apicem ovarii obtectus.

HAB. Chūho, leg. Y. SHIMADA, Sept. 1915.

Near *P. tomentosa*; but differs from it in having leaves which are very scabrous above and densely villose beneath.

### *Galium* LINN.

*Galium trifidum* MICHX.; MAXIM. Mélang. Biol. IX. p. 260; MATSUM. Ind. Pl. Jap. II.-2, p. 588.

HAB. Laco Suisha, leg. B. HAYATA, Aprili. 1916.

Exactly identical with the Japanese species. Fruits glabrous; corolla-lobes 3, white. New to the flora of Formosa.

### *Damnacanthus* GÆRTN.

*Damnacanthus Tashiroi* HAYATA sp. nov. Frutex scandentissimus; rami et ramuli graciles glabri. Folia opposita crasse coriacea oblonga oblongo-obovata 6–7 cm. longa  $2\frac{1}{2}$ –3 cm. lata apice acutissima basi cuneato-attenuata margine integra utraque pagine glabra supra nitida subtus pallida, costa supra impressa subtus elevata, venis supra haud vel vix elevatis subtus non vis divaricatis rectis, petiolis 1 cm. longis glabris, stipulis ignotis. Flores ignoti. Fructus ad axillas foliorum solitariter vel fasciculatim dispositi, pedicellis 5 mm. longis. Bacca depresso-globosa 4 mm. longa 5 mm. lata apice dentibus calycis coronata 4-sperma, seminibus ovoideis 3–4 mm. longis.

HAB. Loochoo, leg. Y. TASHIRO, Mart. 1887.

## Ericaceæ.

### *Rhododendron* LINN.

*Rhododendron formosanum* HEMSLE. in Kew Bulletin 1895, p. 183, n. 200.

“Ramulis floriferis cito glabrescentibus crassis cinereis, foliis confertis distincte petiolatis primum lanato-tomentosis cito glabrescentibus crassis coriaceis subrectis anguste oblanceolatis elongatis obtusissimis deorsum longe attenuatis margine incrassatis supra subnitidis minute reticulatis, costa angustissima impressa subtus cinereis costa elevata, petiolo subterete angustissime canaliculato, cataphyllis arcte imbricatis inferioribus coriaceis brevibus rotundatis ciliolatis superioribus laxis elongatis tenuibus mollibus ferrugineo-pulverulentis, floribus mediocribus racemosis racemis terminalibus vel pseudoterminalibus 7–10 floris, pedicellis longis, calyce ferrugineo puberulo brevissimo obscure late lobato, corolla intus extusque glabra breviter lateque lobata, lobo postico emarginato, staminibus 10 inclusis, filamentis infra medium incrassatis hirsutis,



ovario farfuraceo 5-loculari, stylo glabro crasso stamina superanti, capsula ignota.

"Habitat.—Formosa: South Cape, A. HENRY, 1976.

"Folia 3-6 poll. longa, maxima 1 poll. lata, petioli 6-12 lin. longi. Flores circiter  $1\frac{1}{2}$  poll. longi et diametro. Pedicelli  $1\frac{1}{2}$  poll. longi. Stylus circiter  $1\frac{1}{2}$  poll. longus."

HAB. Sōtenzan, Randaizan, Shinsuiye, Yeg'riyama; Risekizan; Mushazan, Goshizan, Shojodaisan.

**Rhododendron nankotaisanense** HAYATA sp. nov. Frutex; rami validiusculi, cortice cinerascenti; ramulis sursum tenuiter floccoso-tomentellis. Folia lanceolata 9 cm. longa  $2\frac{1}{2}$  cm. lata apice acuta ad summum apiculata basi obtusa integra utraque pagine glabra, costa supra impressa subtus elevata, venis lateralibus supra haud visis subtus gracillime elevatis visis, petiolis 2 cm. longis supra sulcatis. Flores corymbosi, corymbis terminalibus solitariis cum floribus 5 cm. longis totiusque latis, pedicellis 2 cm. longis glabris. Calyx cupuliformis margine 5-lobatus, lobis brevissimis late triangularibus obtusis glabris. Corolla obconico-infundibuliformis  $2\frac{1}{2}$  cm. longa totiusque lata glabra apice 5-lobata, lobis rotundatis latioribus 12 mm. longis 15 mm. latis apice rotundatis apice emarginatis, inæqualibus 3 majoribus, 2 minoribus, glabra. Stamina 10 infra ovarium in disco inserta, filamentis inæqualibus 1-3 cm. longis glabris, antheris obovatis  $3\frac{1}{2}$  mm. longis 2 mm. latis apice truncatis 2-porosis basi obtusis plus minus emarginatis. Ovarium cylindricum 4 mm. longum 2 mm. latum glabrum 5-sulcatum, stylo filiformi  $2\frac{1}{2}$  cm. longo glabro apice plus minus clavato-dilato stigmatoso.

HAB. Nankotaisan, Aprili. 1917, leg. S. SASAKI, No. 57, (typus!).

Near *Rhododendron Morii* HAYATA, but differs from it in the quite glabrous ovary.

## Diapensiaceæ.

### *Shortia* TORR. et GR.

**Shortia transalpina** HAYATA (Fig. 25) Ic. Pl. Formos. III. p. 146. Descriptio aucta:—Bracteæ 2-3 basi floris dispositæ oblongo-triangulares 2-3 mm. longæ basi cordatæ. Sepala 5 valde imbricata oblongo-triangularia 5 mm. longa 3 mm. lata apice obtusa glabra. Corolla campanulata glabra 5-6 mm. longa alte 5-lobata, lobis obovatis 5 mm. longis  $2\frac{1}{2}$ -3 mm. latis apice obtusis versus apicem crenato-lobulatis, crenis obtusis paucis. Stamina



Fig. 25; *Shortia transalpina* HAYATA; 1, the plant; 2, a leaf; 3, a flower; 4, a corolla-lobe; 5, a stamen; 6, ovary; 7, a capsule.

5 lobis corollæ alterna, filamentis glabris toto cum tubo corollæ connata, antheris cordatis 1 mm. longis apice retusis basi cordatis. Ovarium superius conico-globosum glabrum 1 mm. longum, stylo columnari  $1\frac{1}{2}$  mm. longo glabro apice stigmatoso.

HAB. Daibuzan, leg. Y. MATSUDA, Nov. 1918.

## Styraceæ.

### *Alniphyllum* MATSUM.

*Alniphyllum Fauriei* PERKINS in ENGL. Pfl.-reich, Styrac. p. 93;

HAYATA Gen. Ind. p. 45.

HAB. Ōchōbi, leg. B. HAYATA, Mai. 1916, Shinjō, Heirinbi, leg. B. HAYATA.

*Styrax* LINN.

**Styrax kotoense** HAYATA Gen. Ind. Fl. Formos. p. 45. Frutex; ramuli cinereo-rubrescentes flexuosi glabri. Folia alterna tenuiter coriacea vel chartacea ovato-oblonga 10–12 cm. longa 5–7 cm. lata apice caudato-acuminata vel acuta basi obliqua vel rotundata margine subintegra utraque pagine subglabra, costis venisque supra planis subtus prominente elevatis, venulis reticulatis utraque pagine elevatis, petiolis 1 cm. longis glabris. Fructus versus apicem ramorum axillares vel ad ramulos proprios dispositi, pedicellis circ. 2 cm. longis versus apicem incrassatis, calycibus accrescentibus late campanulatis glabris 9–10 mm. in diametro 5-lobatis, lobis late triangularibus; Capsulis ovoideis apiculatis 1 cm. longis, pericarpis crasso-coriaceis cinerascenscentibus, 1-spermis; seminibus oblongis 1 cm. longis profunde 5-sulcatis, testis crustaceis fulvescentibus; albuminibus carnosis.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI; ibidem, leg. Y. TASHIRO, No. 14.

*Symplocos* LINN.

**Symplocos japonica** A. DC.; BRAND. in ENGL. Pfl.-reich, Symplococ. p. 31.

*Symplocos lucida* SIEB. et ZUCC. Fl. Jap. p. 55. t. 24; MATSUM. Ind Pl. Jap. II.-2, p. 487.

HAB. Nōkōzan, ad 8,000 ped. alt., leg. R. KANEHIRA et S. SASAKI, Mart. 1918.

**Symplocos kiraishiensis** HAYATA sp. nov. (Pl. IV.) Frutex, rami et ramuli fuscentes tenuiter griseo-hirsuti recti. Folia minora lanceolata 4 cm. longa 10–12 mm. lata vel oblonga latiora apice acuminatissima plus minus falcata basi acuta vel cuneata integerrima utraque pagine glabra, costa supra elevata subtus plana, venis venulis utraque pagine tenuiter elevatis, coriacea, petiolis 3 mm. longis. Racemi axillares solitarii  $1\frac{1}{2}$  cm. longi, pedicellis 2 mm. longis basi 1-bracteatis, bracteis triangularibus 2 mm. longis  $1\frac{1}{2}$  mm. latis



acutis extus hirsutis, bracteolis basi floris oppositim dispositis elongato-triangularibus  $1\frac{1}{2}$  mm. longis crassiusculis. Calycis tubus (cum ovario) obconicus  $1\frac{1}{2}$  mm. longus paucè hirsutus totiusque latus, limbus campanulatus 3 mm. longus totiusque latus extus paucè hirsutus a medio sursum 5-lobatus, lobis oblongis apice obtusis margine ciliolatis 2 mm. longis  $1\frac{1}{2}$  mm. latis. Corolla campanulata 5 mm. longa totiusque lata, tubo 1 mm. longo, limbo 5-partito, lobis oblongis 3-4 mm. longis apice obtusissimis integris basi haud vel vix contractis. Stamina  $\infty$ , filamentis usque ad medium connatis 4-6 mm. longis glabris, antheris reniformibus  $\frac{2}{3}$  mm. longis fere bipartitis glabris. Ovarium inferius apice impressum hirsutum, stylo 4-5 mm. longo glabro, stigmate plus minus incrassato. Fructus ad racemos solitarii ellipsoidei  $1\frac{1}{2}$  cm. longi 7 mm. lati, pericarpis incrassatis crustaceis 1 mm. crassis, 3-loculares; loculo uno fertili 2-spermo.

HAB. Kiraishi ad 12,000 ped. alt.; leg. Y. SHIMADA, Mart. 1918.

Near *S. morrisonicola* HAY.; but differs from it in the much thicker leaves with entire margin and in the much larger calyx.

**Symplocos Somai** HAYATA sp. nov. Frutex. Rami et ramuli fusco-purpurascens, lenticellis minutis. Folia alterna coriacea oblonga vel ovato-oblonga 5 cm. longa 23 mm. lata apice caudata vel acuta ad summum obtusa basi acuta cuneata margine integra utraque glabra, costa supra impressa subtus elevata, venis venulis utraque pagine tenuissime elevatis gracillimis, petiolis 3-6 mm. longis angustissime alatis. Racemi terminales vel axillares 3-4 cm. longi hirsuti triquetri, pedicellis hirsutis 4 mm. longis, bracteis caducissimis ignotis. Calyx tubuloso-campanulatus, tubo (cum ovario connato)  $1\frac{1}{4}$  mm. longo 1 mm. lato, lobis 5 oblongo-triangularibus  $1\frac{1}{2}$  mm. longis 1 mm. latis apice obtusis utraque glabris. Petala 5 oblonga  $5\frac{1}{2}$  mm. longa  $2\frac{1}{2}$ -3 mm. lata apice obtusa vel rotundata basi haud vel vix contracta glabra basi se connata. Stamina  $\infty$ , filamentis filiformibus glabris, antheris reniformibus  $\frac{1}{2}$  mm. latis utraque emarginatis glabris. Stylus columnaris glaber 5 mm. longus rectus apice truncatus plus minus dilatatus stigmatosus; discus annularis basi styli insitus minute lobulatus.

HAB. Tōyenchō: Daikwaikēi, leg. T. SŌMA, Dec. 1915; Jokirin, leg. S. SASAKI, Mart. 1916.

Near *S. liukuensis* MATSUM., but differs from it in having much thicker leaves with much elevated veins above.

**Symplocos sozanensis** HAYATA sp. nov. Frutex, rami et ramuli glabri graciles fuscentes. Folia alterna tenuiter coriacea oblongo-lanceolata vel lanceolata 4–5 cm. longa  $1\frac{1}{3}$ –2 cm. lata apice caudato-acuminata basi acuta margine minute remoteque serrulata vel subintegra utraque pagine glabra, costa supra impressa subtus elevata, venis venulisque reticulatis utraque pagine tenuissime elevatis, petiolis 6 mm. longis angustissime alatis glabris. Flores ignoti. Racemi fructiferi axillares  $1\frac{1}{2}$  cm. longi solitarii, fructibus ovoideo-urceolatis 7 mm. longis glabris 5 mm. latis.

HAB. Sōzan, leg. Y. SHIMADA, Juli. 1918.

Near *S. okinawensis* MATSUM., but differs from it in having leaves with costas impressed above. In *S. okinawensis*, the costas of the leaves are elevated above.

## Oleaceæ.

### *Jasminum* LINN.

**Jasminum Shimadai** HAYATA sp. nov. (Pl. V. et Fig. 26). Frutex scandentissimus. Ramuli graciles glabri, medulla cava. Folia opposita vel subalterna tenuiter coriacea glabra cruciforme 3-foliolata, foliolis oblongis vel

ovato-oblongis 8–9 cm. longis 5–6 cm. latis apice rotundatis versus summum cuspidatis basi rotundatis margine integris, costa supra impressa subtus elevata, venis gracillimis utraque pagine obscuris tenuissime elevatis, supra nitidis subtus pallidissimis, petiolulo terminali longiore 3–4 cm. longo, petiolulis lateralibus brevioribus 2–3 cm. longis gracilibus glabris, petiolis communibus 3 cm. longis glabris. Paniculæ corymbosæ terminales 10–15 cm. longæ 10

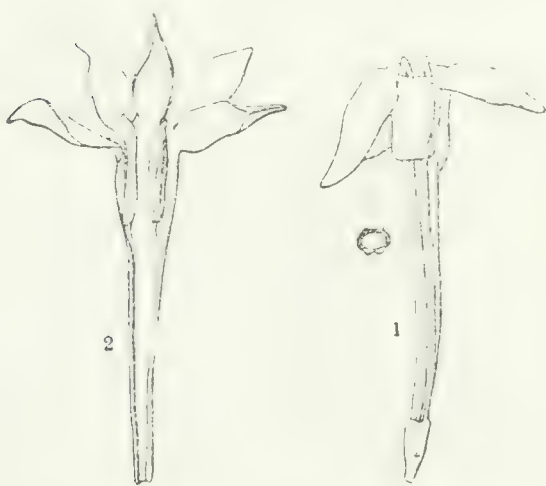


Fig. 26; *Jasminum Shimadai* HAYATA; 1, a flower; 2, corolla of the same flower, expanded.



em. latae, ramis oppositis divaricatis, bracteis subulatis basi dilatis 4–5 mm. longis, bracteis superioribus minutis triangularibus 1 mm. longis plus minus hirsutis. Calyx subsessilis cylindricus 2–2½ mm. longus 2 mm. latus glaber vel tenuissime hirtellus apice ore truncatus haud lobatus. Corolla glabra hypocrateriformis, tubo gracili 2–2½ cm. longo 1½ mm. lato, limbo 4–5-partito, partibus lanceolatis 1 cm. longis 4 mm. latis apice acuminatis basi vix vel haud contractis integris apice plus minus convolutis. Stamina 2 tubo corollæ affixa inclusa, filamentorum partibus liberis brevioribus 2–3 mm. longis glabris, antheris linearibus 5 mm. longis 1 mm. latis apice acuminatis basi truncatis, loculis 2 latere dehiscentibus. Ovarium breve cylindricum 1 mm. longum glabrum apice truncatum impressum, stylo erecto recto glabro filiformi 3–4 mm. longo incluso apice 2-lobato. Fructus (immature) 2-loculares, loculis globosis valde divaricatis 3–4 mm. in diametro, connectivo inter loculos latiusculo.

HAB. Gaogan, leg. S. SHIMADA, Juli. 1918.

Somewhat resembles *Jasminum paniculatum* ROXB.; but differs from it by the much larger rounded leaflets.

### *Osmanthus* LOUR.

***Osmanthus bibracteatus*** HAYATA sp. nov. (Fig. 27). Frutex; ramuli validiusculi glabri cinerascens angulati, cortice fisso plus minus soluto. Folia opposita crasse coriacea oblongo-lanceolata 7–8 cm. longa 2½–3 cm. lata apice acuminata basi obtusa margine integerrima utraque pagine glaberrima, costa supra minus subtus plus elevata, venis gracillimis subtus tenuiter elevatis petiolis 1 cm. longis. Fasciculi florum 4–7-florati axillares solitarii basi 2-bracteati, bracteis oppositis se connatis triangularibus 4 mm. longis totiusque latis extus hirsutis intus glabris apice acutis, pedicellis glabris 1½ cm. longis gracilibus. Calyx glaber late campanulatus 1½ mm. longus 2½ mm. latus 4-lobatus, lobis semi-rotundatis 1 mm. longis 1½ mm. latis apice truncato-rotundatis basi haud contractis margine minute erosis vel integris. Corolla late campanulata glabra 4–5 mm. longa 5–6 mm. lata 4-lobata, lobis rotundato-oblongis 4 mm. longis 3 mm. latis apice obtusis basi plus minus contractis glabris. Stamina 2, filamentis 1 mm. longis glabris, antheris ovato-oblongis



2½ mm. longis 1½ mm. latis apice breve apiculatis basi leviter cordatis glabris. Ovarium glabrum globosum 1 mm. latum minus longum, stylo columniformi 1½ mm. longo, stigmate clavato-globoso medio tenuiter sulcato.



Fig. 27; *Osmanthus bibracteata* HAYATA; 1, a flower-cluster; 2, a flower; 3, corolla; 4, 5, a stamen, seen from different sides; 6, an ovary; 7, a stigma.

HAB. Mt. Daibu, leg. Y. MATSUDA, Nov. 1918.

Near *Osmanthus integrifolius* HAY., but differs from it in the much longer leaves and in the large bivalvate bracts at the base of the flower-clusters.

***Osmanthus daibuensis* HAYATA sp. nov.** (Fig. 28). Frutex; ramuli gracillimi recti cinerei longitudinaliter rugosi lenticellis minutis elevatis conspersi. Folia lanceolata opposita tenuiter coriacea 8–10 cm. longa 1½–2 cm. lata apice caudato-acuminatissima basi cuneata margine integra plus minus undulata, costa supra plana vel impressa subtus elevata, venis supra planis subtus elevatis gracillimis. Flores ad axillas foliorum fasciculati, fasciculis 5–6-floratis basi bracteatis, bracteis triangularibus basi se connatis fasciculum amplexantibus, pedicellis 1 cm. longis glabris. Calyx tetragono-obpyramidalis 1 mm. longus totiusque latus 4-lobatus, lobis late rotundatis ⅔ mm. latis ½ mm. longis apice rotundatis. Corolla obconico-campanulata 3 mm. longa totiusque lata 4-lobata, lobis late oblongis 2 mm. longis totiusque latis apice

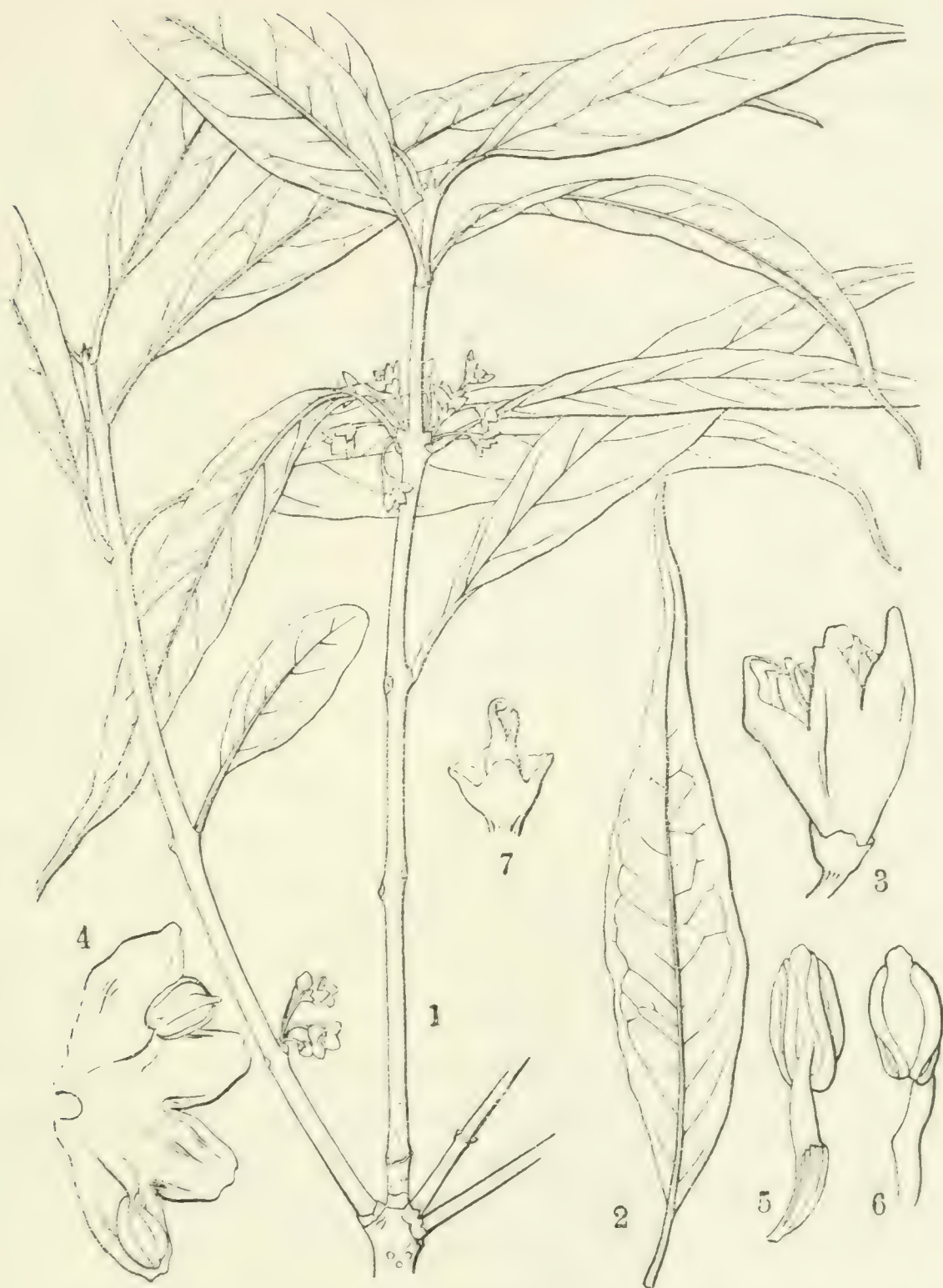


Fig. 28; *Osmanthus dalibiuensis* HAYATA; 1, a branch; 2, a leaf; 3, a flower; 4, corolla, expanded; 5, 6, a stamen, seen from different sides; 7, rudimentary ovary in calyx.

rotundatis glabris basi laud contractis. Stamina 2 tubo corollæ affixa, filamentis glabris, antheris rotundato-oblongis  $1\frac{1}{2}$  mm. longis 1 mm. latis apice

apiculatis basi profunde cordatis glabris. Rudimentum ovarii minutum ovoideum  $1\frac{1}{2}$  mm. longum.

HAB. Mt. Daibu, leg. Y. MATSUDA, Nov. 1918.

Closely resembles *Osmanthus lanceolatus* HAY.; but distinguishable from it in the more acuminate leaves with lateral veins arranged in a much acuter angle.

***Osmanthus gamostromus*** HAYATA sp. nov. (Fig. 29). Frutex vel arborescens, ramulis cinerascens. Folia opposita oblongo-vel ovato-lanceolata 10 cm. longa  $3-3\frac{1}{2}$  cm. lata apice acuminatissima basi obtusa acuta vel

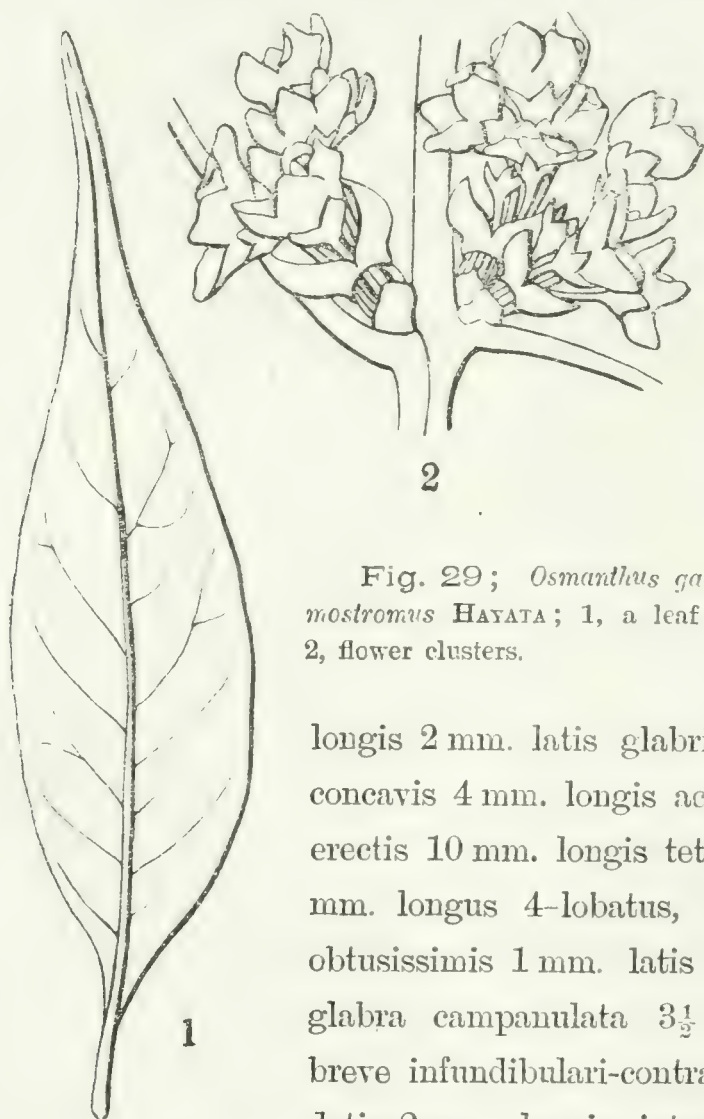


Fig. 29; *Osmanthus gamostromus* HAYATA; 1, a leaf; 2, flower clusters.

cuneata integra vel plus minus crispata vel plana glaberrima chartacea vel chartaceo-coriacea, costis supra impressis, subtus elevatis, petiolis 1 cm. longis. Flores ad axillas foliorum umbellatim fasciculati, fasciculis 5-6-floratis ad axillas foliorum singulis vel geminatis, basi bracteis 4 instructis, bracteis basi per paria se connatis, inferioribus brevissimis triangularibus latissimis 1 mm.

longis 2 mm. latis glabris, superioribus basi se connatis, concavis 4 mm. longis acutis late ovatis, pedicellis glabris erectis 10 mm. longis tetragonis. Calyx campanulatus  $1\frac{1}{2}$  mm. longus 4-lobatus, lobis oblongo-rotundatis glabris obtusissimis 1 mm. latis totiusque longis integris. Corolla glabra campanulata  $3\frac{1}{2}$  mm. longa totiusque lata basi breve infundibulari-contracta medio 4-lobata, lobis rotundatis 2 mm. longis integris apice plus minus retusis vel rotundatis. Stamina 2, antheris oblongo-rotundatis breve apiculatis.

HAB. Arisan, leg. B. HAYATA, Jan. 1912.

Near *Osmanthus lanceolatus* HAY., but distinguishable from it in having:



much broader leaves, in the much acuter sepals and especially in the bracteoles which are connate by pairs at the base.

**Osmanthus Matsudai** HAYATA sp. nov. (Fig. 30). Frutex; rami graciles glabri. Folia opposita coriacea lanceolata 7-8 cm. longa 2-2½ cm. lata apice acuminata basi acuta ad petiolum abeuntia integerrima, costa supra impressa subtus elevata venis venulis obscuris, utraque pagine glaberrima, petiolis 1 cm. longis anguste alatis. Cymæ brevissimæ contractæ 1 cm. longæ axillares solitariae dense bracteatae, bracteis basis cymæ minoribus superioribus majoribus rotundato-ovatis glabris margine ciliolatis 4 mm. longis 2½ mm. latis apice acutis dorso plus minus carinatis, carinis supra apicem productis. Calyx glaber obconicus 1½ mm. longus 1⅔ mm. latus 4-lobatus, lobis rotundato-oblongis margine ciliolatis. Corolla tubuloso-campanulata 4 mm. longa 3 mm. lata 4-lobata, lobis rotundatis 1½ mm. longis margine ciliolatis glabris. Stamina 2 versus apicem tubi corollæ affixa, filamentis glabris 2 mm. longis, antheris rotundatis ⅔ mm. in diametro apice acutis basi 2-lobatis. Ovarium ovoideum glabrum ½ mm. longum apice stigmate sessili coronatum.

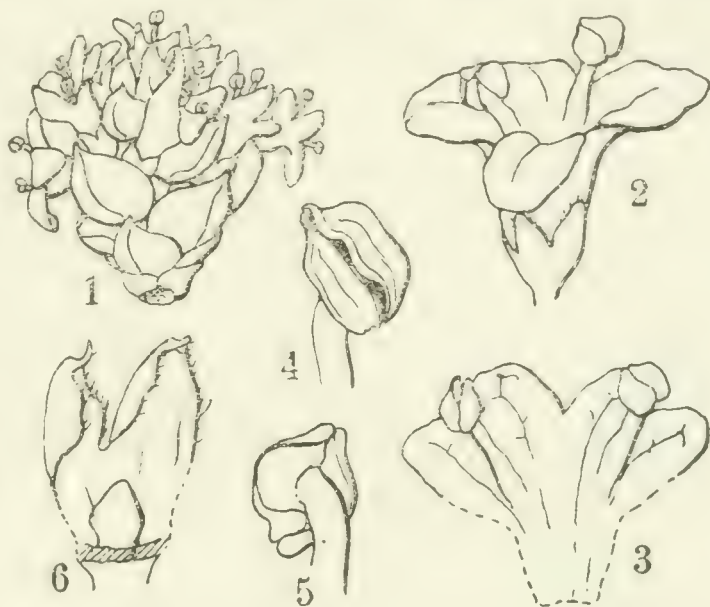


Fig 30; *Osmanthus Matsudai* HAYATA; 1, a flower-cluster; 2, a male flower; 3, corolla, expanded; 4, 5, a stamen, seen from different sides; 6, rudimentary ovary.

HAB. Mt. Buisan, leg. Y. MATSUDA, Juli. 1918.

Somewhat near *O. integrifolius* HAY., but differs from it in the much longer leaves and in the flower-clusters with almost erect pedicels.

## Loganiaceæ.

### *Gardneria* WALL.

**Gardneria hongkongensis** HAYATA sp. nov. Frutex scandentissimus subvolabilis, ramis et ramulis vallido-viridibus glabris. Folia tenuiter coriacea lanceolata vel oblonga 8-9 cm. longa

2½-3 cm. lata apice acuta basi acuta obtusa vel rotundata vel cuneata margine integra in exsiccato supra nitida utraque glabra, cistis venis venalsque supra plus minus elevatis subtus prominente graciliterque elevatis, petiolis 8 mm. longis glabris. Cymæ pauci floratæ axillares vel terminales 3-4 cm. longæ ternatim ramosæ, bracteis cuspidato-triangularibus 1½ mm. longis, pedicellis ultimis glabris 1 cm. longis. Sepala 5 late rotundata 1 mm. longa 1½ mm. lata apice rotundata margine minute ciliolata. Corolla rotata, tubo subnullo, profunde 5-lobata, lobis linearibus 7 mm. longis 1¾-2 mm. latis apice acutis basi haud vel vix contractis conduplicato-valvatis vel valvatis facie interiore late sulcatis glabris. Stamina 5 lobis corollæ alterna ad basin lorum affixa subsessilia ovato-oblonga 3 mm. longa 1 mm. lata apice apiculata basi 2-lobata, connectivis crassissimis. Ovarium ovoideo-globosum 1 mm. longum glabrum apice ad stylum abeuns, stylo 5 mm. longo glabro.

HAB. Hongkong: Happy valley, leg. B. HAYATA, Juni. 1917.

Near *Gardneria multiflora* MAKINO; but differs from it in the leaves with very prominent veins and veinlets underneath, and in the glabrous connectives.

As I was informed by Mr. DUNN, this interesting plant had first been discovered in Hongkong in 1916, a year before I collected the same species in the same island. It is very so close to the Japanese species *G. multiflora* that it was assumed to be identical with the latter. After coming back home, I have compared the plant with the type of *G. multiflora* and found that the Hongkong plant is a little different from the Japanese in the leaves which are very obtuse or round at the base, and have very prominent veins and veinlets underneath. In *G. multiflora*, the leaves are very cuneate at the base and have very slender scarcely prominent veins and veinlets underneath. The leaves of the new species are quite lustrous and iridescent dark green above, very pale beneath.

In referring this plant to *Gardneria*, I have followed REHDER (Fl. Wils. 564) and have retained the genus in the older and wider sense, as the character on which RALSTONSKY relied to separate *Pseudogardneria* from *Gardneria* is not constant; for *G. lanceolata*, as pointed out by REHDER, has the flowers just intermediate between the two genera.

## Convolvulaceæ.

### *Erycibe* ROXB.

#### *Erycibe acutifolia* HAYATA sp. nov.

*Erycibe obtusifolia* HAYATA (non BENTH.) Ic. Pl. Formos. II. p. 122; Gen. Ind. p. 50.

The Formosan plant was formerly identified with the Hongkong plant; but the former is slightly different from the latter in having much acuter leaves.

## Scrophularineæ.

### *Ambulia* LAM.

*Ambulia stipitata* HAYATA sp. nov. Herba aquatica; caulis pauciramosus glaber. Folia opposita verticillata glabra superiora a basi multi-



laciniata in ambitu obovata 1-2 cm. longa 1 cm. lata, laciniis linearibus vel filiformibus  $\frac{1}{2}$ - $\frac{3}{4}$  mm latis 2-3-fidis vel lobatis, lobis linearibus apice acutis. Flores axillares solitarii, pedicellis  $2\frac{1}{2}$  mm. longis erectis rectis. Calyx cylindrico-campanulatus 4 mm. longus 2 mm. latus glaber 5-costatus, costis distinctis vel obscuris, apice 5-lobatus, lobis lineari-triangularibus  $1\frac{1}{2}$  mm. longis apice acutis. Corolla cylindrico-campanulata 10-12 mm. longa 7 mm. lata extus glabra, limbo 2-labiato, labio superiore majore late rotundato 4 mm. longo 5 mm. lato basi plus minus contracto, intus barbato, labio inferiore 8 mm. lato 3 mm. longo, lobo medio rotundato minore 3 mm. longo totiusque lato, lobis lateralibus latioribus 3 mm. longis 4 mm. latis late rotundatis apice truncato-rotundatis; corollæ tubus intus barbatus. Stamina 4 didynama inclusa, filamentis glabris, antheris disjunctis  $\omega$ -formibus 2-ocularibus, loculis a se distinctis. Ovarium conico-ovatum  $1\frac{1}{2}$  mm. longum  $\frac{3}{4}$  mm. latum glabrum, stylo 6 mm. longo. Capsula oblongo-elliptica 4 mm. longa  $2\frac{1}{2}$  mm. lata plus minus complanata apice retusa medio sulcata 2-ocularis loculicide dehiscens. Semina ellipsoidea  $\frac{1}{2}$  mm. longa, testa lævi nigricanti.

*Limnophila stipitata* HAYATA, in Herb. Taihoku.

HAB. Hōzan: Keishūshō, leg. Y. TASHIRO, Feb. 1914.

Near *L. sessiliflora*, but distinguishable from it in the stipitate capsules and nearly rounded seeds.

### *Lindernia* ALL.

***Lindernia stellariifolia*** HAYATA sp. nov. Herba diffusa; caulis a basi ramosissimus; ramis hirsutis acute tetragonis. Folia ovato-rhomboidea vel ovata sessilia opposita 1 cm. longa 7 mm. lata apice triangulari-acuta basi truncata lata margine integra chartacea vel membranacea utraque hirsuta. Flores axillares versus apicem cymosim dispositi, pedicellis 5 mm. longis, bracteis linearibus minutis. Calyx 5-partitus, partibus linearibus 3 mm. longis extus pauce hirsutis margine minute serrulatis. Corolla cylindrico-campanulata 5 mm. longa, limbo 2-labiata, labio superiore erecto 2 mm. longo  $1\frac{1}{2}$  mm. lato oblongo apice retuso, labio inferiore  $2\frac{1}{2}$  mm. longo totiusque lato 3-lobato, lobo medio obovato-rotundato 2 mm. longo  $1\frac{1}{2}$  mm. lato apice rotundato, lobis lateralibus  $1\frac{1}{2}$  mm. longis totiusque latis. Stamina 4 didynama



ad faucem corollæ affixa, filamentis anterioribus inflexis basi appendiculatis, antheris per paria confluentibus, loculis divaricatis basi acutis glabris. Discus antice semi-cupuliformis. Ovarium ovoideum 1 mm. longum glabrum, stylo 4 mm. longo apice plus minus dilatato 2-lobato. Capsula globosa 3 mm. longa glabra 2-valvata. Semina oblonga  $\frac{1}{3}$  mm. longa minute tuberculata.

*Vandellia stellariifolia* HAYATA.

HAB. Kuraru, Taihoku, Akō, Tamsui.

Near *Vandellia scabra* BENTH.; but distinguishable from it in the much smaller leaves.

***Lindernia cruciformis*** HAYATA sp. nov. Herba diffusa 10 cm. longa a basi ramosa; caulis hirsutus. Folia opposita obovata vel obovato-spathulata vel ovata cum petiolis 4 cm. longa 2 cm. lata apice obtusissima basi subito cuneato-attenuata margine crenato-serrata, serris obtusissimis, membranacea utraque pagine parce hirsuta subsessilia. Cymæ terminales 1-2 cm. longæ totiusque latæ paucifloratæ vel axillares glabræ, pedicellis oppositis 5-8 mm. longis divaricatis glabris basi bracteis singulis instructis, bracteis triangularibus minutis  $\frac{1}{2}$  mm. longis. Calyx paucè hirsutus alte 5-partitus, partibus linearibus erectis rectis acuminatis 2-2 $\frac{1}{2}$  mm. longis. Corolla late cylindrica 5-5 $\frac{1}{2}$  mm. longa glabra, limbo 2-labiato, labio superiore brevior subrotundato 1 $\frac{1}{2}$  mm. longo et lato erecto apice rotundato, labio inferiore longiore latiore 2 mm. longo 3 mm. lato 3-lobato, lobo medio rotundato 1 mm. longo et totiusque lato, lobis lateralibus conformibus rotundatis. Stamina 4 didynama ad faucem corollæ affixa, antheris per paria confluentibus 2-ocularibus, loculis divaricatis oblongis  $\frac{1}{4}$  mm. longis, filamentis anterioribus basi appendiculatis glabris. Discus antice semi-cupuliformis. Ovarium glabrum conico-ovoidum 1 mm. longum, stylo 3 mm. longo glabro apice plus minus dilatato. Capsula oblongo-rotundata apice acuta 2-2 $\frac{1}{2}$  mm. longa glabra 2-valvata. Semina numerosissima alba oblonga  $\frac{1}{4}$  mm. longa minutissime tuberculata.

*Vandellia cruciformis* HAYATA.

HAB. Kuraru, Akō.

Near *V. hirsuta* HAMILT.; but differs from it in the leaves with a cuneate base.

*Mimulus* LINN.

**Mimulus formosana** HAYATA sp. nov. Herba gracillima diffusa glabra; caulis circ. 10 cm. longus. Folia opposita glabra ovata vel oblonga membranacea 13 mm. longa 10 mm. lata apice obtusa vel acuta basi obtusa margine remote tenuiter serrata, petiolis 5-8 mm. longis. Flores terminales solitarii, pedunculis 5-8 mm. longis glabris. Calyx obconico-campanulatus 6-7 mm. longus glaber 5-carinatus ad carinas scaberrimus apice 5-dentatus, dentibus minutis 1 mm. longis a se 2 mm. remotis, partibus marginis inter dentes denticulatis. Corolla flava campanulata 11 mm. longa 5 mm. lata, limbo 5-lobato, lobis subaequalibus lato rotundatis  $2\frac{1}{2}$  mm. longis  $3\frac{1}{2}$  mm. latis. Corolla latere inferiore prope faucem 2-striata secus strias glanduloso-hirsuta. Stamina 4 subaequilonga vel plus minus didynama, antheris reniformibus 2-locularibus, filamentis glabris. Ovarium fusiforme 3 mm. longum  $\frac{3}{4}$  mm. latum, stylod-columniformi 4 mm. longo apice dilato 2-labiato.

HAB. Taiheizan, leg. B. HAYATA, Mai. 1917.

Near *M. nepalensis* var. *japonica* MIQ.; but differs from it in having much smaller flowers with less hairy corolla.

*Siphonostegia* BENTH.

**Siphonostegia chinensis** BENTH.; FORBES et HEMSL. Ind. Fl. Sin. II. p. 202; MATSUMURA Ind. Pl. Jap. II.-2, p. 569.

HAB. Kagi.

The genus is new to the flora of Formosa.

*Bonnaya* LINK. et OTTO.

**Bonnaya aristato-serrata** HAYATA sp. nov. Annua; caulis a basi diffuse ramosus glaber. Folia opposita oblonga vel obovato-oblonga 2 cm. longa 6-8 mm. lata membranacea apice obtusissima basi obtusa vel truncata sessilia margine aristato-serrulata, serrulis acutissimis triangularibus ascendentibus ad apicem arista 1 mm. longa instructis, utraque glaberrima. Cymæ terminales paucifloratæ, floribus oppositis, pedicellis 2 mm. longis, bracteis lanceolatis linearibus 3 mm. longis acuminatis. Calyx cylindrico-campanulatus 4 mm.



longus alte 5-lobatus, lobis erectis linearibus 3 mm. longis acuminatissimis margine minute ciliolatis. Corolla tubuloso-campanulata 6 mm. longa a medio sursum 2-labiata, labio superiore lineari 2 mm. longo  $\frac{2}{3}$  mm. lato apice obtuso erecto glabro, labio inferiore latissimo  $2\frac{1}{2}$  mm. longo patenti glabro  $2\frac{1}{2}$  mm. longo 3-lobato, lobis lateralibus oblongis, lobo medio oblongo  $1\frac{1}{2}$  mm. longo. Stamina perfecta 2 postica, loculis antheræ divaricatis, loculo superiore minore, inferiore majore; staminodia 2 antica fauce corollæ affixa. Ovarium fusiforme  $1\frac{1}{2}$  mm. longum glabrum, stylo glabro  $3\frac{1}{2}$  mm. longo apice plus minus dilatato. Capsula cylindrica 1 cm. longa  $1\frac{1}{2}$  mm. lata 2-valvata.

*Ilysanthes aristato-serrata* HAYATA.

HAB. Kagi, leg. T. SŌMA, Sept. 1913.

Near *Bonnaya brachyata* LINK. et OTTO; but differs from it in the aristate serrature of the leaves and in the much smaller leaves and flowers.

### *Torenia* LINN.

***Torenia hokutensis*** HAYATA sp. nov. Herba a basi ramosissima, ramis diffusis tetragonis hirsutis. Folia opposita rotundato-rhomboidæa 2 cm. longa  $1\frac{1}{2}$  cm. lata apice triangulari-acuta basi triangulari-cuneata margine serrata plus minus hirsuta sessilia vel brevissime petiolata. Flores axillares solitarii oppositi versus apicem caulis racemosim dispositi, bracteis minutis linearibus 4-5 mm. longis, pedicellis 5 mm. longis. Calyx cylindrico-campanulatus tenuiter hirsutus 5-partitus, partibus linearibus acuminatis dorso alatis, alis  $\frac{1}{4}$  mm. latis. Corolla cylindrico-campanulata 1 cm. longa glabra flava 2-labiata, labio superiore erecto emarginato; labio inferiore majore patenti 3-lobato. Stamina 4 perfecta, 2-postica inclusa, filamentis brevioribus 1 mm. longis glabris, 2-antica ad faucem affixa, filamentis longioribus exsertis 5 mm. longis, antheris per paria se confluentibus 2-ocularibus, loculis divaricatis. Discus basi ovarii insitus brevissimus annuliformis plus minus lobulatus. Ovarium cylindricum 2 mm. longum glabrum acutum, stylo 7 mm. longo glabro apice plus minus dilatato. Capsula cylindrica apice obtusa 7 mm. longa 2 mm. lata glabra 2-valvata septicide dehiscens. Semina ellipsoidea  $\frac{1}{3}$  mm. longa minute reticulata ovoidea.

*Torenia Fordii* HAYATA Gen. Ind. Fl. Formos. p. 53, (non HOOK. f.).



HAB. Hokuto, Goshizan, Nantō.

Near *T. Fordii* Hook. f., but differs from it in the much elongated racemes.

**Torenia nantoensis** HAYATA sp. nov. Herba diffusa villosa-hirsuta, caulis 30–40 cm. longus ramosus hirsutus. Folia opposita triangulari-ovata vel ovato-oblonga 2 cm. longa  $1\frac{1}{2}$  cm. lata apice triangulari-acuta basi truncata margine serrata, serris triangularibus, utraque pagine villosa, petiolis 1 cm. longis hirsutis. Flores cymosi, cymis longe ramosis, ramis valde divaricatis, pedunculis longis. Calyx hirsutus cylindricus plus minus recurvus 9 mm. longus 5-costulatus 2-labiatus, labiis acutis integris. Corolla cylindrico-campiculata  $1\frac{1}{2}$  cm. longa 2-labiata, labio superiore 5 mm. longo 4 mm. lato obovato apice emarginato, labio inferiore majore patenti 3-lobato, lobo medio obovato 6 mm. longo 5 mm. lato apice rotundato, lobis lateralibus minoribus  $2\frac{1}{2}$  mm. longis  $3\frac{1}{2}$  mm. latis; corolla intus prope basin hirsuta, lobis lateralibus intus latere exteriori plus minus hirsutis, cæterum glabra. Stamina 4 didynama, 2-postica inclusa, filamentis  $1\frac{1}{2}$  mm. longis, antheris 2-ocularibus, loculis divaricatis alatis; 2-antica exserta, filamentis 7 mm. longis basi appendiculatis. Discus cupuliformis. Ovarium cylindricum 3 mm. longum 1 mm. latum, stylo 9–10 mm. longo glabro apice dilatato 2-lobato, lobis ovatis obtusis margine ciliolatis. Capsula cylindrica apice obtusa 9 mm. longa 2–3 mm. lata 2-valvata. Semina globosa  $\frac{1}{4}$  mm. in diametro, leviter fuscentia.

HAB. Nantō, leg. Y. SHIMADA, Nov. 1917.

Near *Torenia hirtella* Hook. f.; but differs from it in the minutely villose leaves.

### *Veronica* LINN.

**Veronica polita** FR ; MATSUMURA Ind. Pl. Jap. II.-2, p. 572.

HAB. Shiringai, leg. T. SŌMA, Feb. 1915.

### Acanthaceæ.

#### *Hygrophila* R. BR.

**Hygrophila pogonocalyx** HAYATA sp. nov. Herba annua erecta; caulis tetragonus, internodiis subglabris, ad nodos densissime hirsutus. Folia

opposita chartacea lineari-lanceolata 9 cm. longa 12 mm. lata apice obtusa basi late attenuata sessilia margine subintegra utraque pagine scaberrima breve hirsuta. Flores sessiles ad nodos glomeratim dispositi multi-bracteati, bracteis ovatis vel lanceolatis  $1\frac{1}{2}$  cm. longis 4–6 mm. latis apice caudato-acuminatis extus strigosis intus glabris. Calyx subcylindricus  $1\frac{1}{2}$  cm. longus usque ad medium 5-fidus, lobis subæqualibus linearibus acuminatis. Corolla tubuloso-ampliata  $2\frac{1}{2}$  cm. longa 5 mm. lata, limbo 2-labiato, labio superiore erecto 1 cm. longo apice breviter 2-lobato, labio inferiore plus minus patenti apice 3-lobato, lobis æquiformibus, lobo medio oblongo 3 mm. longo 2 mm. lato apice obtuso; corolla intus barbata. Stamina 4 didynama, antheris oblongis 3 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusissimis basi sagittatim 2-lobatis glabris. Stylus glaber. Discus pulviniformis. Ovarium conico-cylindricum  $2\frac{1}{2}$  mm. longum 1 mm. latum glabrum.

HAB. Toroku, leg. Y. SHIMADA, Juni. 1917.

Near *Hygrophila salicifolia* NEES., but differs from it in the much more barbate bracts, and in the very scabrous hirsute leaves.

### *Strobilanthes* BLUME.

***Strobilanthes lasiocalyx*** HAYATA sp. nov. Herba basi suffrutescens glabra; caulis basi procumbens sursum ascendens, parte ascendenti 30–40 cm. longa subtetragona. Folia opposita oblongo-lanceolata cum petiolis 10 cm. longa  $2\frac{1}{2}$  cm. lata apice acuminatissima basi attenuata margine tenuiter serrulata membranacea vel chartacea utraque glabra, petiolis  $\frac{1}{2}$  cm. longis. Flores cymosi sessiles, cymis 2–3-floratis pedunculatis axillaribus vel terminalibus, bracteis caducissimis lineari-ovatis  $1\frac{1}{2}$  cm. longis 3–4 mm. latis apice caudato-acuminatis dorso 1-carinatis; (bracteolis nullis?). Calyx altè 5-partitus segmentis linearibus  $1\frac{1}{2}$  cm. longis 1 mm. latis hirsutis. Corolla extus parce hirsuta tubuloso-campulata 3 cm. longa 1 cm. lata, limbo 5-lobato, lobis late rotundatis 6 mm. latis 3–4 mm. longis fere conformibus apice emarginatis. Stamina 4 didynama, antheris late triangulari-cordatis 2-ocularibus 1 mm. longis  $1\frac{1}{2}$  mm. latis apice late triangulari-obtusis. Stylus glaber. Ovarium ovoideo-cylindricum  $1\frac{1}{2}$  mm. longum apice hirsutum.

HAB. Shinten, leg. U. FAURIE, Januario 1914.



Near *Strobilanthes formosanus* MOORE; but differs from it in having glabrous leaves and in the lanceolate acuminate bracts. The leaves of *S. formosanus* are hirsute, and the bracts of the same species are ovate and nearly obtuse.

***Strobilanthes longespicatus* HAYATA** sp. nov. Caulis erectus 4 ped. altus ramosus, ramis subtetragonis glabris. Folia oblonga vel oblongo-lanceolata 13 cm. longa 4½ cm. lata apice acuta basi cuneato-attenuata margine obscure remoteque serrulata chartacea utraque glabra, venis venulisque utraque pagine elevatis, petiolis 2–3 cm. longis. Flores quasi-spicati, spicis axillaribus vel terminalibus 10–15 cm. longis; flores ad nodos spicæ oppositi sessiles bracteis singulis bracteolis duabus instructi; bracteis lineari-lanceolatis 1½ cm. longis 5 mm. latis apice attenuatis ad summum obtusis basi truncatis haud contractis chartaceis concavis ad rhachin adpressis glabris; bracteolis lineari-lanceolatis minoribus 2½ mm. longis 1½ mm. latis apice acuminatis basi obtusis glabris margine hirsutis intus glabris erectis ad calycem adpressis. Calyx erectus (tubus brevissimus 2 mm. longus) fere 5-partitus, segmentis erectis linearibus æqualibus 13 mm. longis 2–3 mm. latis apice acuminatis margine hirsutis intus extusque glabris dorso 1-costatis, costis plus minus carinatis. Corolla cylindrica 5 cm. longa fauce 1½ cm. lata basi subito contracta ad tubum 1 cm. longum 3 mm. latum abeuns extus glabra recta haud vel vix recurva; limbus subpatens 5-lobatus, lobis subæqualibus triangulari-rotundatis 8 mm. longis totiusque latis apice obtusis retusis. Corolla extus glabra intus deorsum tenuissime barbata. Stamina didynama, filamentis cum tubo corollæ alte connatis hirsutis, partibus liberis 2–10 mm. longis, posterioribus brevioribus 2 mm. longis, anterioribus longioribus 10 mm. longis, antheris 2-ocularibus oblongis apice truncatis basi alte 2-lobatis, lobis obtusis glabris, loculis parallelis. Stylus filiformis 3 cm. longus hirsutus apice plus minus incrassatus recurvus, lobo postico obsoleto. Ovarium cylindrico-oblongum apice paucè hirsutum. Capsula linearis glabra 17 mm. longa 4 mm. lata. Semina 4 oblongo-rotundata 3 mm. longa valde complanata hirsuta, retinaculis acutis.

HAB. Taitō: Harōye, leg. KOBAYASHI, Oct. 1907, No. 6011.

Remarkable for the very long erect spikes with acuminate persistent bracts.



**Strobilanthes prionophyllus** HAYATA sp. nov. Herba, ramis rectis subtetragonis glabris. Folia ovato-oblonga 5–6 cm. longa  $2\frac{1}{2}$ –3 cm. lata apice longe acuminata basi subito acuta ad extremitatem longe attenuata ad petiolum abeuntia margine serrata, serris ascendentibus valde recurvis, membranacea utraque pagine subglabra, petiolis 4 cm. longis; folia variabilissima superiora multo minora. Flores terminales vel axillares solitarii vel geminati, bracteis singulis bracteolis duabus instructi, bracteis minutis linearibus 3 mm. longis 1 mm. latis concavis glabris; bracteolis linearibus apice obtusis glabris 6 mm. longis 1 mm. latis. Calyx glaber rectus alte 2-labiatus, labio posteriore 3-fido, labio anteriore 2-fido, lobis vel segmentis 7–10 mm. longis linearibus 1 mm. latis dorso 1-costatis glabris. Corolla tubuloso-campanulata 3 cm. longa fauce  $1\frac{1}{2}$  cm. lata extus glabra; limbus 5-lobatus, lobis subæqualibus late-rotundatis 7 mm. latis 5 mm. longis; corolla extus glabra intus subglabra. Stamina didynama, antheris oblongo-linearibus 3 mm. longis 1 mm. latis apice obtusissimis basi 2-lobatis, lobis obtusis glabris, filamentis plus minus hirsutis. Stylus recurvus glaber. Discus cylindricus 1 mm. longus infra ovarium insidens. Ovarium ellipsoideum 2 mm. longum glabrum 1 mm. latum.

HAB. Taitō: Inikufukusha, leg. U. MORI, Dec. 1899, No. 2150.

Near *S. flexicaulis* HAY.; but distinguishable from it in the very sharply serrate leaves.

**Strobilanthes rankanensis** HAYATA sp. nov. Caulis tenuissimus basi procumbens ad nodos radices emittens, partibus ascendentibus 15 cm. longis gracillimis. Folia opposita ovato-rhomboidea  $1\frac{1}{2}$  cm. longa 8 mm. lata apice triangulari-acuta vel obtusa basi subito acuta margine paucè obscureque serrata utraque pagine subglabra vel paucissime hirsuta herbacea, petiolis 5 mm. longis hirsutis. Flores axillares solitarii vel quasi-terminales subsessiles, bracteis nullis, bracteolis duabus instructi; bracteolis linearibus 5 mm. longis  $\frac{2}{3}$  mm. latis obtusis plus minus hirsutis. Calyx 2-partitus 7–8 mm. longus, parte superiore 3-fida, parte inferiore 2-fida; lobis linearibus glabris vel paucè hirsutis margine ciliolatis. Corolla sursum campanulata basi tubulosa  $2\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata extus glabra, limbo 5-lobato, lobis subæqualibus triangulari-rotundatis glabris. Stamina 4 didynama, antheris oblongo-linearibus. Discus columniformis 1 mm. longus  $\frac{1}{3}$  mm. latus infra ovarium insitus. Ovarium

cylindrico-ellipsoideum glabrum  $1\frac{1}{3}$  mm. longum  $\frac{1}{3}$  mm. latum; stylus filiformis 2 cm. longus glaber. Capsula 2-valvata 12 mm. longa 4-sperma, retinaculis acutis; semina oblonga  $2\frac{2}{3}$  mm. longa  $1\frac{3}{4}$  mm. lata adpresso-hirsuta valde complanata.

HAB. Rankanzan, ad 4,600 ped. alt., leg. B. HAYATA, Mai. 1916.

Near *S. flexicaulis* HAY.; but differs from it in the very much smaller leaves.

**Strobilanthes Tashiroi** HAYATA sp. nov. Herba; caulis basi repens ad nodos radicans sursum ascendens, parte ascendenti 25-30 cm. longa, tetragonus subglaber. Folia opposita oblongo-lanceolata vel lanceolata 8-9 cm. longa 3 cm. lata apice acuminata basi subito vel gradatim ad petiolum abeuntia margine obscure et tenuiter serrulata vel subintegra utraque pagine subglabra subtus ad venas tenuiter hirsuta membranacea. Flores racemosi, racemis paucifloratis terminalibus, pedicellis 1-2 mm. longis, bracteis singulis bracteolis duabus instructi, bracteis lineari-spathulatis 13 mm. longis; bracteolis linearibus calycem in longitudine æquantibus 1 cm. longis  $1\frac{1}{2}$  mm. latis obtusis hirsutis. Calyx 2-partitus, parte superiore 3-fida, parte inferiore 2-fida, segmentis 13 mm. longis pauce hirsutis. Corolla campanulata 2 cm. longa, limbo 5-lobato. Stamina didynama, filamentis hirsutis. Stylo glabro. Discus 1 mm. longus infra ovarium insitus; ovarium obovoideo-cylindricum glabrum  $2\frac{1}{2}$  mm. longum. Capsula 13 mm. longa glabra 4-sperma, retinaculis linearibus 3 mm. longis acuminatis; semina valde complanata  $2\frac{1}{2}$  mm. longa brevissime hirsuta  $1\frac{2}{3}$  mm. lata.

HAB. Loo-choo: Okinawajima, leg. Y. TASHIRO, Mart. 1887.

Somewhat resembles *S. formosanus* MOORE; but differs from it in the total absence of the bracts in the much narrower linear calyx-lobes and in the much thinner smaller leaves.

### *Rungia* NEES.

**Rungia chinensis** BENTH. Fl. Hongk. p. 266; DUNN et TUTCHER Fl. Hongk. et Kwangt. p. 200.

HAB. Raisha, leg. U. FAURIE, Mart. 1914, No. 725.

New to the flora of Formosa.

### *Dicliptera* JUSS.

**Dicliptera uraiensis** HAYATA sp. nov. Herba basi suffrutescens; caulis ramosissimus, ramis gracilibus tenuiter hirsutis. Folia opposita membranacea lanceolata 7 cm. longa  $1\frac{1}{2}$  cm. lata apice acuminata ad summum obtusa basi obtusa margine obscure crenata vel undulata utraque pagine tenuiter hirsuta, petiolis  $\frac{1}{2}$  cm. longis. Flores quasi-cymosi, cymis terminalibus; bracteæ oppositæ lanceolatæ apice obtusæ basi rotundatæ 10-12 mm. longæ 4 mm. latæ intus glabræ extus hirsutæ margine ciliolatæ flores sessiles 2-4 includentes;



bracteolis triangulari-lanceolatis 2 mm. longis margine ciliolatis. Calyx cylindricus 4 mm. longus pauce ciliolatus alte 5-fidus, lobis linearibus ciliolatis acuminatis. Corollæ tubus  $1\frac{1}{2}$  cm. longus 1 mm. latus extus glaber; limbo extus hirsuto 2-labiato, labiis æquiformibus extus hirsutis intus glabris margine ciliolatis obovatis vel oblongis 8 mm. longis 3-5 mm. latis apice rotundatis obscure brevissime 2-3-lobatis. Stamina 2 labio breviora, filamentis retrorse hirsutis, antheris 2-ocularibus discretis, loculo altero superiore, altero inferiore affixo, lineari 1- $1\frac{1}{2}$  mm. longo glabro. Stylus filiformis apice 2-lobatus. Ovarium cylindricum  $1\frac{1}{2}$  mm. longum glabrum.

HAB. Uraisha, leg. S. SASAKI.

Near *D. japonica*; but differs from it in the much narrower leaves and in the lanceolate bracts.

## Labiatae.

### *Ocimum* LINN.

***Ocimum Tashiroi*** HAYATA Ic. Pl. Formos. VIII. p. 109. Caulis tetragonus erectus, ramulis gracilibus pubescentibus. Folia inferiora non vîsa superiora ovata 3 cm. longa 2 cm. lata apice triangulari-acuminata basi subito triangulare acuta ad extremitatem ad petiolum attenuata margine præter acumen acute serrata, serris triangularibus haud vel vix recurvis utraque pagine subglabra membranacea, petiolis 2 cm. longis. Racemi terminales ve; versus apicem ramorum paniculatim dispositi 5-6 cm. longi; floribus ad nodos racemi fasciculatim dispositis, fasciculis 3-4 floratis alternis 1-bracteatis, bracteis ovatis 1 mm. longis totiusque latis apice digitatim serratis hirsutis; pedicellis 1 mm. longis hirsutis. Calyx plus minus declinatus tubuloso-campanulatus  $1\frac{1}{2}$  mm. longus 1 mm. latus patento-hirsutus et dense glanduloso-punctatus, lobo postico magno subrotundato apice acuto  $\frac{2}{3}$  mm. longo, lobis lateralibus linearibus circ. 1 mm. longis margine ciliatis, lobis anticis linearibus longissimis 1 mm. longis ciliolatis; calyx intus glaber. Corollæ tubus 2 mm. longus calyce æquilongus glaber  $\frac{2}{3}$  mm. latus; limbus 2-labiatus, labio postico 3-lobato, lobo postico dorso hirsuto rotundato, lobis lateralibus conformibus, labio antico oblongo 1 mm. longo obtuso glabro. Stamina didynama filamentis longioribus  $\frac{2}{3}$  mm. longis, antheris confluentibus 1-ocularibus.



Discus in glandulam 1 ovario breviorē tumens. Stylus  $\rho$ -formiter recurvus glaber apice 2-lobatus. Nuculæ obovoideæ glabræ.

HAB. Holisha, leg. Y. TASHIRO, Mart. 1896 (No. 9, A.).

## Proteaceæ.

### *Helicia* LOUR.

***Helicia hainanensis* HAYATA** sp. nov. Arborescens; rami et ramuli glabri, lenticellis nullis. Folia alterna sed approximativè quasi-verticillatimque disposita chartacea vel tenuiter coriacea ovato-oblanccolata vel oblanceolata 12–17 cm. longa 5–7 cm. lata apice caudato-acuta ad summum obtusa et ad centrum apiculata basi cuneato-attenuata ad extremitatem obtusissima, margine remotissime serrulata utraque pagine glabra, costis venis venulisque utraque pagine elevatis grosse reticulatis, sessilia. Racemi terminales vel axillares simplices haud ramosi cum pedunculis 2 cm. longis 15–20 cm. longi cum floribus 4 cm. lati glabri, pedicellis glabris 3 mm. longis divaricatissimis. Segmenta calycis 4 linearia spiraliter recurvata  $1\frac{1}{2}$  cm. longa  $\frac{1}{2}$  mm. lata apice plus minus dilatata, partibus dilatatis  $3\frac{1}{2}$  mm. longis  $1\frac{1}{4}$  mm. latis apice acutis, glabra. Stamina 4 sessilia, antheris glabris lineari-oblongis 3 mm. longis  $\frac{2}{3}$  mm. latis apice crasse apiculatis basi obtusis; glandulæ 5 cum segmentis calycis alternæ rotundatæ  $\frac{2}{3}$  longæ totiusque latæ glabræ crassiusculæ. Ovarium oblongo-ovoideum 1 mm. longum breve stipitatum apice attenuatum, stylo filiformi recto glabro apice clavato-incrassato stigmatoso.

HAB. Hainan, leg. S. KONISHI, Juli. 1909.

Near *Helicia robusta* WALL. (HOOK. f. Fl. Brit. Ind. V. p. 191); but differs from it in the smaller and thinner leaves.

## Elæagnaceæ.

### *Elæagnus* LINN.

***Elæagnus buisanensis* HAYATA** sp. nov. (Fig. 31–I.) Frutex. Rami et ramuli fusco-purpurascens. Folia oblongo-obovata vel -ovata vel oblanceolata tenuiter coriacea 5 cm. longa 18–20 mm. lata apice acuta vel subito acuminata basi acuta vel obtusa margine integra supra glabra subtus densiuscule lepidota, lepidibus  $\frac{1}{4}$  mm. in diametro fusco-rubrescentibus. Fl. ♂: ignoti. Fl. ♀: Ovarium cum calycis tubo lineari-ellipsoideum 6 mm. longum  $2\frac{1}{2}$  mm. latum dense lepidotum; limbo obconico-tubuloso 9 mm. longo 5 mm. lato apice 4-lobato, lobis triangularibus  $2\frac{1}{2}$  mm. longis totiusque latis apice acutis extus dense lepidotis intus hirsutis. Stamina 4, antheris sessilibus.

HAB. Buisan, leg. S. SASAKI, Mart. 1910.

Near *E. glabra* THUNB., but differs from it in the much smaller oblong leaves.

**Elæagnus convexolepidota** HAYATA sp. nov. (Fig. 31-II.) Frutex, rami et ramuli fulvo-cinerascentes. Folia ad ramulos brevissimos hornotinos dense disposita decidua chartacea obovata vel oblonga 2-3 cm. longa 12-15 mm. lata apice acuta vel rotundata basi acuta vel obtusa margine integra supra fusco-nigricantia pauca stellato-hirsuta subtus densissime argenteo-lepidota, petiolis 3-4 mm. longis. Flores ad axillas foliorum honotinorum 2-3-glomerati, pedicellis 3-4 mm. longis. Calycis tubus supra constrictionem obconico-campanulatus 4-5 mm. longus 2-3 mm. latus, limbo 4-lobato, lobis triangularibus  $2\frac{1}{2}$  mm. longis totiusque latis apice acutis.

HAB. Musha: Oiwake, ad 7,500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *E. Oldhami*, but differs from it in the convex scales on the under surface of the leaves.

**Elæagnus daibuensis** HAYATA sp. nov. (Fig. 31-V.) Frutex. Folia oblonga vel oblongo-ovata coriacea 8 cm. longa  $3\frac{1}{2}$  cm. lata apice acuta vel acuminata basi obtusa vel rotundata margine integra supra pauca subtus dense lepidota, petiolis 1- $1\frac{1}{2}$  cm. longis. Flores quasi-umbellati, umbellis 3-4-floratis, pedicellis 1-2 mm. longis. Calyx supra constrictionem 7 mm. longus, tubo 3-4 mm. longo  $2\frac{1}{2}$  mm. lato, limbo 4-lobato, lobis triangularibus 2 mm. longis totiusque latis apice acutis.

HAB. Daibusan, leg. S. NAKAI, Dec. 1912.

Near *Elæagnus rotundata*, but distinguishable from it in the much more adpressed scales on the under surface of the leaves.

**Elæagnus erosifolia** HAYATA sp. nov. (Fig. 31-IV.) Frutex, rami et ramuli dense lepidoti fuscentes. Folia oblongo-lanceolata vel lanceolata 7 cm. longa  $2\frac{1}{2}$  cm. lata apice triangulari-acuta basi obtusa margine erosa tenuiter coriacea supra glabra subtus densissime lepidota, lepidibus fulvo-rubescens, venis lateralibus supra haud elevatis subtus leviter elevatis gracillimis, petiolis 1 cm. longis. Flores quasi-umbellati, umbellis axillaribus 8-10-floratis, pedicellis 3 mm. longis gracilibus. Calycis supra constrictionem limbus 8-9 mm. longus apice 4-lobatus, lobis oblongo-triangularibus  $3\frac{1}{2}$  mm. longis  $2\frac{1}{2}$  mm. latis apice acutis intus hirsutis. Stamina 4.

HAB. Shatōzan, Ōkaseki.

Near *Elæagnus glabra* THUNB.; but differs from it in the leaves which



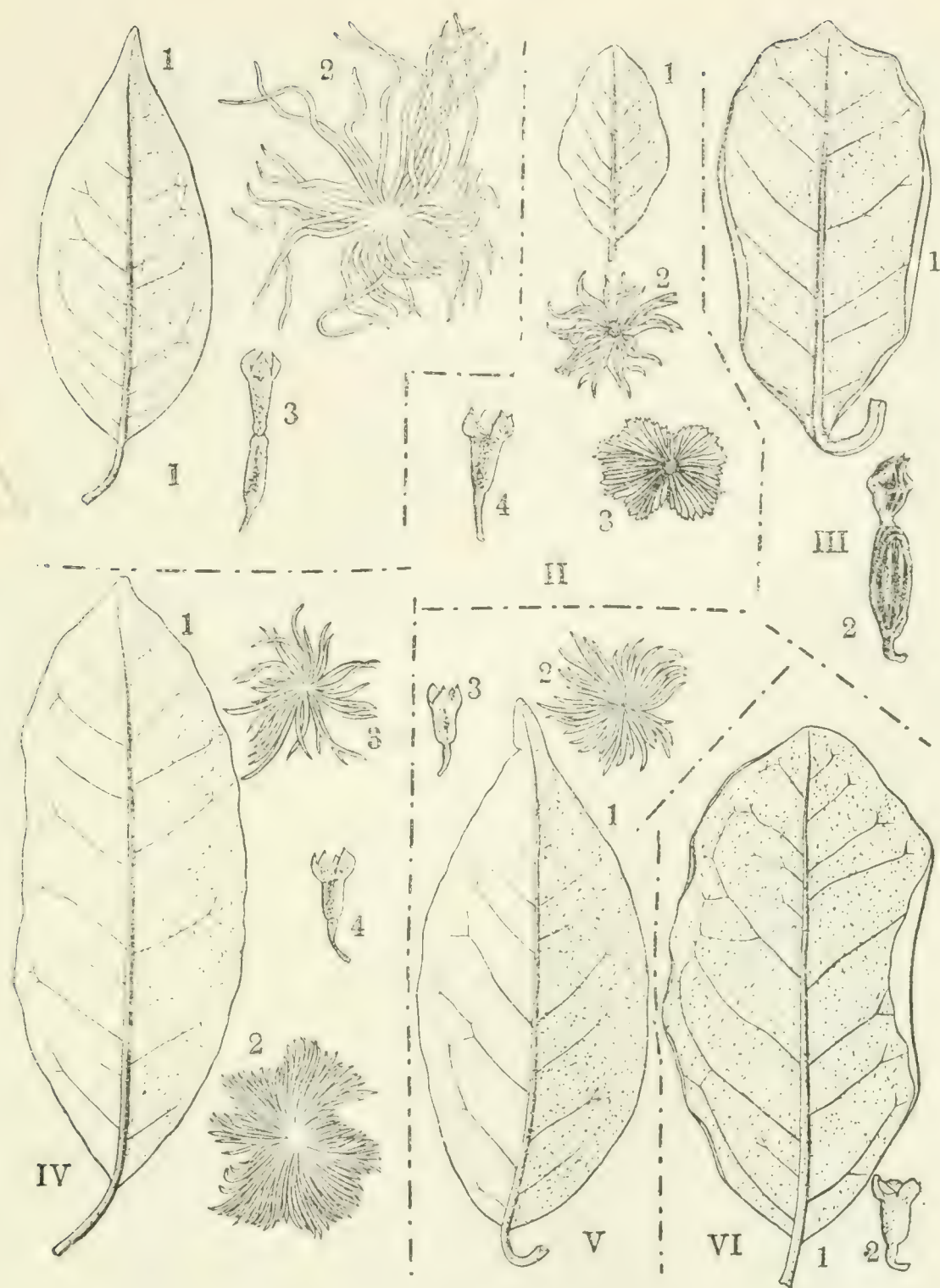


Fig. 31; I, *Elæagnus buisanensis* HAYATA; 1, a leaf; 2, a hair on the under surface of a leaf; 3, a flower. II., *Elæagnus convexolepidota* HAYATA; 1, a leaf; 2, a hair on the upper surface of a leaf; 3, a hair on the lower surface of a leaf; 4, a flower. III., *Elæagnus kotoensis* HAYATA; 1, a leaf; 2, a flower. IV., *Elæagnus erosifolia* HAYATA; 1, a leaf; 2, a colored hair on the under surface of a leaf; 3, a colorless hair on the same leaf; 4, a flower. V., *Elæagnus dalibensis* HAYATA; 1, a leaf; 2, a hair on the under surface of a leaf; 3, a flower. VI., *Elæagnus formosana* NAKAI; 1, a leaf; 2, a flower.



are crenate on the margin.

**Elæagnus grandifolia** HAYATA sp. nov. Frutex scandentissimus, ramuli fulvo-cinerascentes. Folia magna tenuiter coriacea ovato-oblonga vel oblongo-lanceolata 18 cm. longa  $7\frac{1}{2}$  cm. lata apice subito acuta vel acuminata basi obtusa rotundata vel tenuiter cordata margine subintegra, petiolis 5–10 mm. longis. Calycis tubus supra constrictionem 9 mm. longus extus dense lepidotus apice 4-lobatus, lobis oblongo-triangularibus 3 mm. longis acutis.

HAB. Taiheizan: Kamiyodani, Mai. 1917, leg. B. HAYATA.

Remarkable for its very large leaves.

**Elæagnus kotoensis** HAYATA (Fig. 31-III.) Frutex; rami validiusculi. Folia alterna coriacea obovato-oblonga vel oblonga  $5\frac{1}{2}$ – $6\frac{1}{2}$  cm. longa  $2\frac{1}{2}$ – $3\frac{1}{2}$  cm. lata apice obtusissima basi obtusa margine integerrima deorsum recurva supra glabra minute remoteque punctata subtus densissime lepidota, petiolis  $1\frac{1}{2}$  cm. longis. Fl. ♂: ignoti. Fl. ♀: calycis tubus apice constrictus; limbus obconico-campanulatus 8 mm. longus utraque pagine dense depresso-hirsutus, pilis stellatis, medio sursum 4-lobatus, lobis  $3\frac{1}{2}$  mm. longis  $2\frac{1}{2}$  mm. latis apice acutis. Stamina 4 basi loborum cum lobis alternatim disposita subsessilia, antheris oblongo-linearibus  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice émarginatis; lobi calycis utraque pagine dense hirsuti; sed tubo limbi calycis extus hirsuto intus glabro.

HAB. Kōtōshō, leg. Y. KIKUCHI, Dec. 1909.

Near *E. pungens* BL.; but differs from it in the very much depressed scales on the under surface of the leaves.

**Elæagnus longidrupa** HAYATA sp. nov. (Fig. 32-I.) Frutex scandentissimus, ramis et ramulis longissimis rectis. Folia tenuiter coriacea vel chartacea lineari-lanceolata vel lanceolata apice acuminata basi acuta vel cuneata margine subintegra supra glabra subtus densiuscule lepidota, petiolis 1 cm. longis. Calycis tubus supra constrictionem 4 mm. longus, limbo 4-lobato, lobis oblongo-triangularibus 4 mm. longis  $1\frac{1}{2}$ –2 mm. latis apice acutis. Drupa cylindrico-elliptica  $1\frac{1}{2}$  cm. longa 5 mm. lata lepidota.

HAB. Arisan: Funkiko et Heishana, leg. B. HAYATA, Mart. 1914.

Near *E. morrisonensis* HAY., but distinguishable from it in the much longer lanceolate leaves with always acute base.

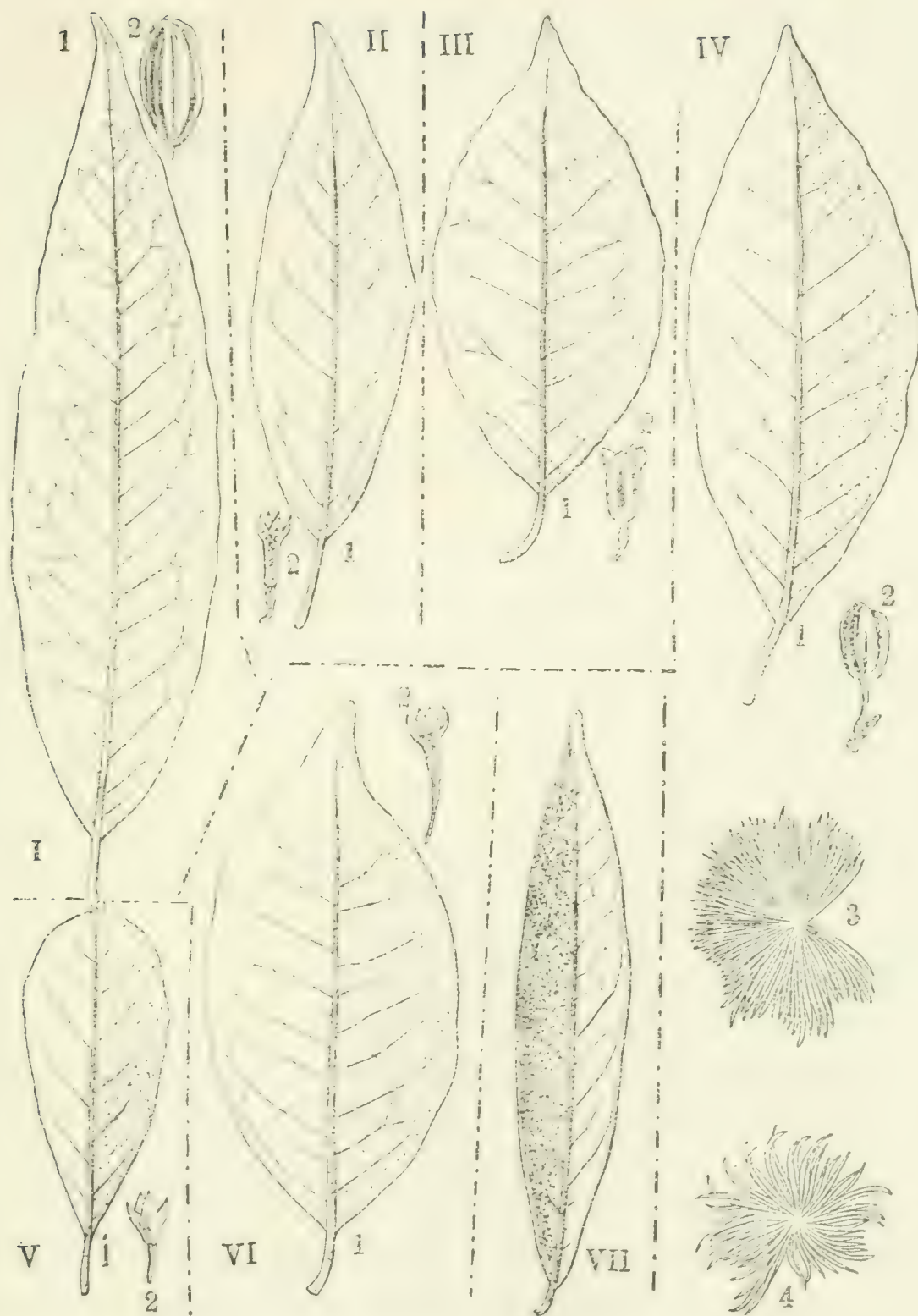


Fig. 32; I., *E. longidrupa* HAY.; 1, a leaf; 2, a drupe. II., *E. morrisonensis* HAY.; 1, a leaf; 2, a flower. III., *E. Thunbergii*; 1, a leaf; 2, a flower. IV., *E. oiwakensis* HAY.; 1, a leaf; 2, a drupe; 3, a colored hair on the under surface of a leaf; 4, a colorless hair on the same surface. V., *E. Oldhami* HEMSL.; 1, a leaf; 2, a flower. VI., *E. paucilepidota* HAY.; 1, a leaf; 2, a flower. VII., *E. nokoensis* HAY.

**Elæagnus nokoensis** HAYATA sp. nov. (Fig. 32-VII.) Frutex. Rami et ramuli densissime lepidoti. Folia oblanceolata vel lineari-oblanceolata 9 cm. longa 2 cm. lata apice subito acuminata basi obtusissima margine subintegra supra glabra, venis nervisque supra distincte elevatis subtus laud distinctis, pagine densissime lepidota, lepidibus albicantibus, petiolis 7 mm. longis. Fructus ellipsoideo-ovoideus 1 cm. longus, pedicellis 1 cm. longis.

HAB. Nōkōzan, leg. R. KANEHIRA et S. SASAKI, Mai. 1916, (No. 56).

Near *E. morrisonensis* HAY., but differs from it in the oblanceolate leaves with elevated veins on the upper surface.

**Elæagnus oiwakensis** HAYATA sp. nov. (Fig. 32-IV.) Frutex. Rami fuscentes minute hirsuti. Folia oblonga vel oblongo-lanceolata 7-8 cm. longa 3-3½ cm. lata apice acuminata vel acuta basi obtusa margine subintegra supra glabra subtus densissime lepidota, (folia hornotina subtus fulvo-rubescencia); petiolis 1-1½ cm. longis. Flores quasi-umbellati, umbellis 3-4-floratis. Calyx supra constrictionem 8 mm. longus, tubo 5 mm. longo, limbo 4-lobato, lobis triangularibus 2½ mm. longis totiusque latis apicē acutis extus lepidotis intus hirsutis.

HAB. Gōkwanzan: Oiwake, ad 7,000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *E. morrisonensis* HAY., but differs from it in the brownish red scales on the under surface of the young leaves.

**Elæagnus paucilepidota** HAYATA sp. nov. (Fig. 32-VI.) Frutex. Rami glabri. Folia elliptica oblonga vel obovato-oblonga 7-9 cm. longa 4-5 cm. lata apice acuta basi obtusa margine subintegra tenuiter coriacea supra glabra subtus densiuscule lepidota, lepidibus rotundatis laud superpositis laud imbricatis dispositis, venis lateralibus gracillimis, petiolis 1-1½ cm. longis. Fl. quasi-umbellati, umbellis axillaribus 5-6-floratis, pedicellis 5 mm. longis. Calycis tubus cum parte ovariifera 6 mm. longus apice dilatus 4-lobatus, lobis triangulari-oblongis 3 mm. longis 2½ mm. latis apice acutis extus dense lepidotis intus dense hirsutis. Stamina 4, antheris sessilibus.

HAB. Shintiku: Goshizan, leg. T. KAWAKAMI, Dec. 1905.

Near *E. glabra* THUNB.; but differs from it in the obovate or oblong leaves with a few scattered scales on the under surface.



## Euphorbiaceæ.

*Securinega* COMM.

*Securinega fluggeoides* MUELL. ARG.; HAYATA Gen. Ind. p. 68.

HAB. Kōtōshō; Taito.

*Agyneia* VENT.

*Agyneia bacciformis* A. JUSS.; HOOK. f. Fl. Brit. Ind. V. p. 285;  
WIGHT Ic. Pl. t. 1893.

*Phyllanthus bacciformis* LINN.; BENTH. Fl. Hongk. p. 310.

HAB. Anping, leg. T. SŌMA, Oct. 1914.

New to the flora of Formosa.

*Phyllanthus* LINN.

*Phyllanthus oligospermus* HAYATA sp. nov. Frutex. Rami graciles, ramulis glabris gracillimis rubro-purpurascensibus toto foliatis. Folia oblonga vel elliptica 2-3 cm. longa 10-13 mm. lata apice obtusissima ad centrum summi breve minuteque cuspidata basi cuneata tenuiter chartacea basi cuneata acuta margine integra utraque glabra subtus pallida plus minus glauca, petiolis 2 mm. longis. Flores monoecii 4-5 ad axillas foliorum congesti. Fl. ♂, pedicellis gracilibus 4 mm. longis stipitatis. Sepala 5-4 oblonga vel obovata exteriora concava interiora plana 2 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa vel rotundata glabra. Stamina 5-3 ad centrum floris congesta, filamentis liberis glabris  $1\frac{1}{2}$  mm. longis, antheris reniformibus apice basique marginatis. Rudimentum ovarii 0. Discus minutus lobatus vel ad nullum reductus. Fl. ♀: pedicelli validi 3 mm. longi glabri. Sepala 5-6 oblongo-lanceolata  $2\frac{1}{2}$  mm. longa 2 mm. lata apice subito cuspidata basi obtusa margine sursum integra vel erosa. Ovarium ovideum  $1\frac{1}{3}$  mm. longum  $1\frac{1}{4}$  mm. latum glabrum apice ad stylum abeuns; styli parte basilari haud fida  $\frac{2}{3}$  mm. longa, parte superiore 3-fido, ramis patentissimis 2 mm. longis gracillimis recurvis. Bacca globosa 8 mm. in diametro 4-sperma. Semina quadrantiformia 3 mm. longa  $2\frac{1}{2}$  mm. lata.

HAB. Taikokan, leg. Y. SHIMADA; Sankakuyū, leg. T. SŌMA.

Near *P. reticulata*, but differs from it in the much larger flowers.

**Phyllanthus takænsis** HAYATA sp. nov. Frutex. Rami graciles, ramulis gracillimis toto foliiferis. Folia oblōnga obovata oblongo-lanceolata  $1\frac{1}{2}$ –2 cm. longa 7–8 mm. lata apice obtusissima basi cuneata vel obtusa margine integra utraque glabra tenuiter chartacea subtus pallidissima, petiolis 1–2 mm. longis, stipulis triangulari-lanceolatis 1 mm. longis. Flores ad axillas foliorum 5–10–congesti, pedicellis gracillimis 8–10 mm. longis glabris. Fl. ♂: sepala 5 inæqualia, exteriora oblonga 2 mm. longa  $1\frac{1}{4}$  mm. lata apice rotundata basi haud contracta concava glabra; stamina 5 fere connata. Fl. ♀ ignoti.

HAB. Takao: Ape's Hill, leg. B. HAYATA, Aprili. 1917.

Near *Phyllanthus reticulatus* POIR., but differs from it in the much smaller leaves.

### *Glochidion* FORST.

**Glochidion Arnottianum** MUELL. ARG. in Linnæa XXXII. p. 60; FORBES et HEMSL. Ind. Fl. Sin. II. p. 424.

*Glochidion hirsutum* HAYATA Gen. Ind. Fl. Formos. p. 67. (non MUELL. ARG.)

HAB. Suisha, Taihoku.

NOTE: Fruits pale green or slightly purple; seeds scarlet, shining; male flowers pale-green.

**Glochidion chademenosocarpum** HAYATA sp. nov. Frutex; ramuli gracillimi glabri. Folia alterna subdistiche disposita chartacea oblonga vel obovata 5–8 cm. longa  $2\frac{1}{2}$ –4 cm. lata apice obtusissima basi oblique acuta margine integerrima utraque pagine glaberrima sessilia vel brevissime petiolata, petiolis 2–3 mm. longis, stipulis cuspidato-triangularibus  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis glabris crassiusculis. Flores ♂ et ♀ intermixti ad axillas densissime glomeratim dispositi. Fl. ♂: pedicellis gracillimis 1 cm. longis tenuiter hirsutis; sepala 6, exteriora majora obovata  $2\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata apice obtusissima basi cuneata glabra, interiora angustiora  $2\frac{1}{2}$  mm. longa 1 mm. lata; stamina 3 toto connata, appendicibus liberis, antheris linearibus. Fl. ♀ perfecte sessiles; sepala 6 subæqualia extus glabra intus tenuiter hirsuta basi erecta medio sursum extrorse patentia oblanceolata  $1\frac{1}{2}$  mm. longa  $\frac{1}{2}$  mm. lata apice obtusa

basi cuneata; ovarium depresso-globosum  $\frac{1}{2}$  mm. longum 1 mm. latum, stylo cum stigmate 1 mm. longo columniformi  $\frac{2}{3}$  mm. crasso apice circ. 8-sulcato.

HAB. Inter Ronō et Kōsenpo, leg. B. HAYATA, Oct. 1917.

Near *G. Fortunei*, but differs from it in the much densely clustered and perfectly sessile female flowers.

**Glochidion eriocarpum** CHAMP.; BENTH. Fl. Hongk. p. 314; FORBES et HEMSL. Ind. Fl. Sin. II p. 424.

HAB. Taishū: Daitonpo; Giochi; Suiteiryō.

**Glochidion Fortunei** HANCE; HAYATA Gen. Ind. p. 66.

HAB. Ape's Hill, leg. B. HAYATA, Aprili. 1917.

NOTE: Flowers pale yellow; fruits violet-red; seeds orange-red.

**Glochidion hongkongense** MUELL. ARG.; HAYATA Gen. Ind. p. 67.

*Glochidion zeylanicum* HAYATA Gen. Ind. p. 67. (non A. JUSS.)

HAB. Suisha, Kelung, Taitō, Liukiu.

NOTE: Male flowers pale yellow; fruits pale green; seeds scarlet-red, shining.

**Glochidion hypoleucum** HAYATA sp. nov. Frutex; rami et ramuli graciles recti plus minus hirsuti. Folia alterna subdistiche disposita oblonga vel elongato-elliptica  $4\frac{1}{2}$ – $6\frac{1}{2}$  cm. longa  $2$ – $2\frac{1}{2}$  cm. lata apice obtusa basi obtusissima vel rotundata margine integra basi plus minus obliqua vel aequalia supra glabra subtus tenuissime hirsuta chartacea subtus pallidissima, petiolis 3 mm. longis. Flores ad axillas glomeratim siti, fl. ♂ et ♀ intermixti. Fl. ♂ pedicellati, pedicellis gracillimis 6 mm. longis tenuiter hirsutis; sepala 6, exteriora majora oblonga 3 mm. longa 2 mm. lata apice obtusissima crassiuscula glabra, interiora minora  $2\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata; stamina 3 toto connata sessilia, appendicibus liberis acutis, cum appendicibus  $1\frac{1}{2}$  mm. longa, antheris 1 mm. longis elongato-ovatis. Fl. ♀: sessiles vel breve pedicellati, pedicellis 1–2 mm. longis erectis hirsutis; sepala 6 vel 3, inaequalia hirsuta, majora obovata 1 mm. longa; ovarium hirsutum cum stigmate obconico-cylindricum 2 mm. longum, stigmate validissimo incrassato  $1\frac{1}{2}$  mm. longo 1 mm. lato basi hirsuto sursum glabro apice 3-lobato.

*Glochidion bicolor* HAYATA Gen. Ind. Fl. Formos. 67. (non MUELL. ARG.)

HAB. Holisha: Giochi, leg. B. HAYATA, Aprili. 1916.



Near *G. sinicum* HOOK. et ARN., but differs from it in the much longer obconical stigmata.

**Glochidion kotoense** HAYATA sp. nov. Frutex; rami et ramuli graciles erecti recti glabri. Folia alterna tenuiter coriacea ovato-oblonga vel oblonga valde obliqua 10 cm. longa  $3\frac{1}{2}$ –4 cm. lata apice acuminata vel cuspidato-acuminata ad summum obtusa et apiculata basi obliquissima, latere superiore acuta latere inferiore rotundata, margine integra utraque pagine glabra, petiolis 5 mm. longis glabris. Capsula depresso-globosa valde depressa 7 mm. in diametro 4 mm. longa glabra leviter lobata.

HAB. Kōtōshō.

Near *G. fagifolium*, but differs from it in the much more oblique and acuminate leaves.

**Glochidion kusukusense** HAYATA sp. nov. Frutex; ramuli graciles erecti recti glabri. Folia alterna chartacea lanceolata 4– $6\frac{1}{2}$  cm. longa  $1\frac{1}{2}$ –2 cm. lata apice acuminata ad summum breve apiculata basi acuta plus minus obliqua margine integra utraque glabra, petiolis 5 mm. longis. Flores ♂ ad axillas foliorum glomeratim dispositi, pedicellis gracillimis 5 mm. longis glabris; sepala 6 inæqualia, exteriora majora oblonga  $1\frac{1}{2}$  mm. longa 1 mm. lata apice acuta glabra, interiora minora; stamina 3 toto connata apiculata  $\frac{2}{3}$  mm. longa.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, Juli. 1912.

Near *Glochidion Wrightii* BENTH.; but differs from it in the not very oblique leaves and in the much longer pedicels of male flowers.

**Glochidion sphærostigma** HAYATA sp. nov. Frutex; rami et ramuli graciles plus minus hirsuti. Folia alterna subdistiche disposita ovata vel ovato-lanceolata chartaceo-coriacea plus minus obliqua 9–10 cm. longa 3– $3\frac{1}{2}$  cm. lata apice acuminata basi oblique acuta vel rotundata margine integra utraque pagine glabra, petiolis 5 mm. longis tenuiter alatis. Flores ♀ ad axillas glomeratim vel umbellatim dispositi, pedunculis umbellæ 4 mm. longis glabris, pedicellis florum 4 mm. longis rectis glabris; sepala 6 subglabra inæqualia, exteriora majora triangulari-rotundata 1 mm. longa totiusque lata apice acuta, interiora oblonga acuta 1 mm. longa  $\frac{1}{2}$  mm. lata. Ovarium globosum hirsutum  $1\frac{1}{2}$  mm. longum totiusque latum, stigmate sessili depresso

tenuiter 5-6-lobato brevissimo. Fructus depresso-globosus valde depressus 6-8 mm. latus 3-4 mm. longus subglaber.

HAB. Shintiku: Shinpo; Suisha; (typus!) Kaukaukei, Hokuto.

Near *Glochidion hongkongense*; but differs from it in the much acuminate leaves with acute base, and in the hirsute ovaries.

**Glochidion suishænse** HAYATA sp. nov. Frutex; ramuli graciles glabri. Folia alterna subdistiche disposita tenuiter coriacea  $4\frac{1}{2}$ - $8\frac{1}{2}$  cm. longa 3- $4\frac{1}{2}$  cm. lata ovata obovata vel oblonga apice obtusa vel acuta basi cuneata vel obtusa vel rotundata integra utraque pagine glabra, petiolis 3 mm. longis. Flores ad axillas glomeratim dispositi, fl. ♂ et ♀ intermixti. Fl. ♂: pedicellis glabris gracilibus; sepala 6 inæqualia obovato-cuneata, exteriora majora 3 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusissima basi cuneata glabra, interiora minora  $2\frac{1}{2}$  mm. longa basi cuneata 1 mm. lata apice obtusissima; stamina 3 toto connata apice breve apiculata. Fl. ♀: breve pedicellati, pedicellis 1- $1\frac{1}{2}$  mm. longis glabris; sepala 6, exteriora majora oblonga 2 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa obscure denticulata vel integra glabra, interiora minora angustiora glabra 2 mm. longa  $\frac{2}{3}$  mm. lata margine minute ciliolata denticulata vel integra. Ovarium depresso-globosum glabrum 1 mm. latum  $\frac{2}{3}$  mm. longum, stylo obconico-cylindrico 2 mm. longo glabro apice clavato-truncato multi-lobulato. Fructus depresso-globosus  $1\frac{1}{2}$  cm. in diametro 8 mm. latus profunde 6-sulcatus glaber. Semina rubra.

HAB. Suisha; Hakku, Hōgō.

Near *G. Fortunei* HANCE; but distinguishable from it in the much larger oblong leaves, and in the much larger capsules.

NOTE: Leaves fresh green shining above, costa and veins elevated above; male flower pale green-yellow; capsules greenish more or less purple, seeds red.

### *Antidesma* LINN.

**Antidesma acutisepalum** HAYATA sp. nov. Frutex; rami et ramuli graciles lenticellis minutis notati tenuiter hirsuti recti. Folia lanceolata 9 cm. longa 2 cm. lata apice acuminatissima basi obtusa margine integra utraque pagine glabra, sed subtus ad costas tenuissime hirsuta chartacea vel tenuiter



coriacea, petiolis 5 mm. longis tenuiter hirsutis, stipulis lineari-lanceolatis hirsutis  $2\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis acuminatis recurvis. Flores dioecii spicati; spicis breve hirsutis 2–3 cm. longis, floribus pedicellatis basi 1-bracteatis, bracteis lanceolatis acuminatis glabris 1 mm. longis. Sepala 4–5 lanceolato-ovata glabra. Stamina 4. Rudimentum ovarii minutum glabrum.

HAB. Giyochi, leg. B. HAYATA, Aprili. 1916.

Near *A. japonicum*; but distinguishable from it in the much acuter sepals and in the presence of rudimental ovaries.

**Antidesma hiiranense** HAYATA sp. nov. Frutex; rami et ramuli graciles. Folia obovata vel oblongo-obovata 4–5 cm. longa 2 cm. lata apice plus minus cuspidata ad summum obtusa basi cuneata margine integra utraque glabra sed subtus ad costas plus minus hirsuta tenuiter coriacea, petiolis 3 mm. longis hirsutis, stipulis caducissimis ignotis. Flores dioecii; spicæ fl. ♂ terminales vel rarius axillares plus minus ramosæ vel simplices. Fl. ♂ pedicellati, pedicellis basi 1-bracteatis, bracteis ovatis 1 mm. longis laceratis vel 3-fidis margine subciliatis. Sepala 4. Stamina 4. Flores ♀ spicati, spicis terminalibus simplicibus, floribus ignotis.

HAB. Hiiranzan, leg. B. HAYATA et S. SASAKI, Juni. 1912.

Near *A. japonicum*, but differs from it in the much thicker leaves which are obovate, shortly caudate and obtuse at the apex.

**Antidesma rotundisepalum** HAYATA sp. nov. Frutex; rami et ramuli minute hirsuti validi plus minus cinerascens lenticellis minutis notati. Folia oblonga vel ovato-oblonga  $6\frac{1}{2}$ – $7\frac{1}{2}$  cm. longa  $3\frac{1}{2}$  cm. lata apice acuminata vel triangulari-acuta ad summum obtusa ad centrum breve apiculata basi obtusa margine integra tenuiter chartacea, venis venulisque utraque pagine distincte elevatis, utraque pagine glabra sed subtus ad costas minute hirsuta, petiolis 3–4 mm. longis minute hirsutis, stipulis lineari-lanceolatis 5 mm. longis  $1\frac{1}{2}$  mm. latis hirsutis. Flores dioecii spicati, spicis terminalibus vel quasiterminalibus solitariis vel geminatis; spicis fl. ♂ simplicibus vel paucè ramosis gracillimis suberectis 7–8 cm. longis hirsutis, sessilibus; floribus pedicellatis, pedicellis hirsutis 1 mm. longis basi bracteis singulis instructis, bracteis oblongo-lanceolatis 1 mm. longis hirsutis. Fl. ♂: sepala 4 rotundato-ovata  $\frac{2}{3}$  mm. lata  $\frac{1}{2}$  mm. longa extus hirsuta apice triangulari-acuta; stamina 4, filamentis glabris.



$\frac{2}{3}$  mm. longis distinctis, antheris 2-ocularibus divaricatis, loculis globosis, connectivis reniformibus glabris. Rudimentum ovarii minutum. Discus magnus pulviniformis incrassatus lobulatus inter stamina expansus. Spicæ fl. ♀ terminales rectæ erectæ solitariæ subsimplices minute hirsutæ, floribus pedicellatis, pedicellis 1 mm. longis basi 1-bracteatis, bracteis 1 mm. longis hirsutis  $\frac{1}{2}$  mm. latis. Fl. ♀: sepala 5 inæqualia, exteriora elongato-triangularia glabra  $\frac{2}{3}$  mm. longa  $\frac{1}{2}$  mm. lata apice acuto-obtusa basi haud contracta intus basi pectinato-hirsuta. Ovarium glabrum oblique ovoideum 1 mm. longum  $\frac{2}{3}$  mm. latum, stigmatibus 3-fido, lobis patentissimis  $\frac{1}{4}$  mm. longis. Achænium oblique lentiforme biconvexum 3-4 mm. longum 3 mm. latum apice rostratum facie muricatum.

HAB. Kōshūn: Taisenseki, leg. B. HAYATA, Juni. 1912.

Near *A. japonicum*, but differs from it in the rounded lobes of the calyx of the male flowers.

### *Mallotus* LOUR.

***Mallotus ricinoides*** MUELL. ARG.; HEMSL. Ind. Fl. Sin. II. p. 442.

HAB. Hainan, leg. S. KONISHI, Juni. 1909. No. 82.

### *Macaranga* THOUARS.

***Macaranga Henricorum*** HEMSL. Ind. Fl. Sin. II. p. 442.

HAB. Hainan, leg. S. KONISHI.

### *Acalypha* LINN.

***Acalypha kotoensis*** HAYATA sp. nov. Suffrutescens. Ramuli apice plus minus hirsuti versus apicem foliiferi. Folia longe petiolata cordata 11 cm. longa  $7\frac{1}{2}$  cm. lata apice cuspidato-acuminata basi cordata margine serrulata, serrulis ascendentibus obtusis, 5-7 nervia tenuiter chartacea supra plus minus scabra subtus plus minus hirsuta, petiolis 8-10 cm. longis adpresse hirsutis, stipulis lineari-lanceolatis 12 mm. longis  $1\frac{1}{2}$  mm. latis hirsutis. Fl. dioecii. F. ♀: dense spicati; spicis ad axillas foliorum superiorum insitis solitariis 5-6 cm. longis, floribus sessilibus 1-bracteatis bracteis late reniformibus 4-5 mm. latis 3 mm. longis margine dentatis extus hirsutis intus glabris. Sepala 3-4 inæqualia rhombica  $\frac{2}{3}$  mm. longa margine ciliolata intus glabra extus hirsuta

apice acutis. Capsula 3-cocca, coccis  $1\frac{1}{2}$  mm. longis 1 mm. latis hirsutis. Semina oblique ovoidea lævia  $1\frac{1}{4}$  mm. longa  $\frac{2}{3}$  mm. lata.

HAB. Kōtōshō, leg. MIYAKE, Sept. 1899.

Near *A. akoensis* HAY.; but differs from it in the much smaller bracts.

**Acalypha longe-acuminata** HAYATA sp. nov. Frutex; ramuli erecti recti, pilis patentibus, conspersi sulcati. Folia longe petiolata ovata vel ovato-cordata 15–20 cm. longa 8–12 cm. lata apice caudato-acuminata basi tenuiter cordata tenuiter chartacea margine serrulata, serrulis obtusis vel breve apiculatis ascendentibus, 5-nervia utraque pagine tenuiter hirsuta, petiolis 5–10 cm. longis gracillimis patento-hirsutis, stipulis linearibus 12 mm. longis 2–3 mm. latis acuminatis extus villosis intus glabris. Flores monoecii spicati, spicis fl. ♂ gracillimis axillaribus 20 cm. longis suberectis, rhachibus dense villosis, floribus breve pedicellatis, pedicellis  $\frac{1}{4}$  mm. longis, bracteis minutis  $\frac{1}{4}$  mm. longis hirsutis; floribus densissime congesto-spicatis. Fl. ♂: sepala 4 triangulari-oblonga  $\frac{1}{4}$  mm. longa totiusque lata apice acuta extus pauce hirsuta intus glabra; stamina 8, filamentibus basi connatis, antheris vermiformibus  $\frac{1}{4}$  mm. longis, connectivis apiculatis. Spicæ fl. ♀ longissimæ axillares solitariae erectæ rectæ 20 cm. longæ, pedunculis 4–5 cm. longis, stipitatae villosæ, floribus dense spicatis insitis sessilibus 1-bracteatis, bracteis reniformibus 7 mm. latis 4–5 mm. longis longe dentatis, dentibus triangularibus acuminatis 1–2 mm. longis, extus hirsutis intus glabris. Fl. ♀: sepala 3 ovato-oblonga 1 mm. longa extus hirsuta intus glabra. Capsula 3-cocca, coccis  $1\frac{1}{2}$  mm. longis 1 mm. latis dense villosis. Semina ovoidea lævia.

HAB. Akō: Naiho, leg. T. SŌMA, Sept. 1915.

Remarkable for the very long male and female spikes.

**Acalypha Matsudai** HAYATA sp. nov. Suffrutex. Rami graciles rubro-purpurascens scandentes plus minus hirsuti lenticellis minutis linearibus notati. Folia oblongo-lanceolata 5–8 cm. longa  $1\frac{1}{2}$ –3 cm. lata apice acuminata ad summum obtusa ad centrum apiculata basi obtusa vel obtusissima vel rotundata margine serrulata utraque pagine subglabra membranacea vel tenuiter chartacea 3-nervia, petiolis 1–2 cm. longis gracillimis hirsutis. Flores monoecii spicati, floribus superioribus masculinis, flore infimo uno foemineo; spicis axillaribus, gracillimis 3–4 cm. longis erectis. Flores ♂ secus rhachin



spicæ glomeratim siti, ad nodos 5-6 aggregati breve pedicellati, pedicellis  $\frac{1}{2}$  mm. longis, basi bracteis minutis hirsutis ovatis  $\frac{1}{5}$  mm. longis. Sepala 4 valvata oblonga apice acuta  $\frac{1}{3}$  mm. longa subglabra. Stamina 8, filamentis basi connatis glabris  $\frac{1}{3}$  mm. longis, antheris vermiformibus connectivis apiculatis. Fl. ♀: ad basin spicæ solitariter siti bracteis singulis instructi. Capsula 3-coeca, coccis oblongis  $2\frac{1}{2}$  mm. longis dorso hirsutis. Semina lævia complanato-ovoidea  $1\frac{1}{2}$  mm. longa 1 mm. lata apice breve rostrata.

HAB. Banchoryō, Raisha, leg. Y. MATSUDA, Juni. 1916.

Somewhat resemble *A. Dalzellii* HOOK. f. (in Fl. Brit. Ind. V. p. 414); but differs from it in the denticulate bracts with very much longer male spikes.

### *Aleurites* FORST.

***Aleurites triloba*** FORST; HEMSL. Ind. Fl. Sin. II. p. 434.

*Aleurites moluccana* WILLD.; MUELL. ARG. in DC. Prodr. XV.-2, p. 723.

HAB. Banchōryō, cult.

### *Claoxylon* A. JUSS.

***Claoxylon kotœense*** HAYATA sp. nov. Frutex. Rami validi teretes exsiccato cinerascens cicutricibus foliorum approximativ notati glabri. Folia versus apicem foliorum approximativ alternativque disposita herbacea oblonga vel oblongo-lanceolata 18-20 cm. longa 7-8 cm. lata apice acuta vel acuminata ad summum obtusa basi obtusa margine serrata, serris remotis obtusis brevibus, supra scabriuscula, petiolis 5-6 cm. longis. Flores dioecii spicati, spicis axillaribus solitariis. Fl. ♂: racemoso-spicati, spicis 6-7 cm. longis, floribus ad nodos spicæ aggregativ dispositis pedicellatis, pedicellis 3 mm. longis; sepala 3 rarius 4 oblonga  $2\frac{1}{2}$  mm. longa 2 mm. lata apice obtusa glabra; Stamina ∞, filamentis liberis 1-2 mm. longis, antheris Y-formibus, glandulis inter stamina multis bracteoliformibus  $\frac{1}{2}$  mm. longis laceratis. Capsula 3-coeca, coccis 4 mm. longis. Semina subglobosa 3 mm. longa apice apiculata basi rotundata facie impresso-reticulata, testa crustacea nigricanti.

*Claoxylon rubescens* HAYATA Gen. Ind. Fl. Formos. p. 65, (non MIQ.)

HAB. Kōtōshō, typus!; Kōshūn.



Near *C. indicum*; but differs from it in the quite glabrous leaves and racemes.

**Claoxylon indicum** HASSE.; HOOK. f. Fl. Brit. Ind. V. p. 410.

HAB. Hainan, leg. Z. KATSUMADA, Juli. 1908.

*Alchornea* SW.

**Alchornea kelungensis** HAYATA sp. nov. Frutex; rami validi glabri fusco-purpurascens. Folia alterna triangulari-cordata triangulari-rotundata vel cordata 9–12 cm. longa 8–12 cm. lata apice breve cuspidato-acuta basi rotundata vel cordata margine remote serrulata, serrulis a se 5 mm. distantibus, distincte 3-nervia, nervis a se 30°–40° egressis, chartacea vel tenuiter coriacea basi glandulis 5 notata, glandulis rotundatis 1 mm. in diametro rubescentibus, pagine supra glabra subtus tenuiter hirsuta, petiolis 3–5 cm. longis tenuiter hirsutis, stipulis caducissimis cuspidiformibus 4–5 mm. longis. Flores monoecii spicati, spicis unisexualibus vel bi-sexualibus terminalibus 7–10 cm. longis tenuiter hirsutis. Fl. ♂ ad nodos spicarum glomerati, glomerulis bracteis singulis instructis circ. 10-floratis, bracteis triangulari-cuspidatis 2 mm. longis dorso hirsutis margine ciliolatis, bracteolis inter flores ♂ multo insitis lanceolatis 1 mm. longis ciliatis, floribus pedicellatis, pedicellis 1–2 mm. longis; sepala 4–5 oblonga 2½ mm. longa 1½ mm. lata apice obtusa glabra; stamina 8–10, filamentis glabris basi dilatis connatis patentibus, antheris cordatis 1 mm. longis apice haud vel vix apiculatis. Fl. ♀: ad nodos spicæ solitarii, bracteis singulis triangulari-cuspidiformibus 3 mm. longis 2½ mm. latis apice cuspidatis ciliatis extus hirsutis, bracteolis duabus minutis ciliatis instructi, pedicellis incrassatis 1 mm. longis glabris; sepala 5 triangulari-cuspidiformia 2½ mm. longa 2 mm. lata apice caudato-acuminata margine ciliolata basi plus minus cordata; ovarium depresso-globosum 2 mm. in diametro tenuiter hirsutum, stylis 3 basi connatis patentissimis divaricatissimis. Capsula depresso-globosa 1 cm. lata 8 mm. longa glabra tenuiter 3-sulcata. Semina complanato-obovoidea apice subtruncata basi obtusa vel truncata facie cinerascens ver. rucosa 7 mm. longa.

HAB. Kelung, leg. Y. SHIMADA, Juli. 1918.

Near *A. trewioides* BENTH.; but distinguishable from it in the much

shorter styles, broader sepals and less hairy capsules. The genus is new to the flora of Formosa.

**Alchornea loochoënsis** HAYATA sp. nov.

*Alchornea trewioides* HAYATA Rev. Euph. Bux. Jap. in Journ. Coll. Sci. XX-3, p. 47, (non MUELL. ARG.)

HAB. Loo-choo: Kumejima.

***Euphorbia* LINN.**

***Euphorbia formosana*** HAYATA Gen. Ind. Fl. Formos. p. 66.

*Euphorbia orientalis* HAYATA Gen. Ind. Fl. Formos. p. 66, (non LINN.).

***Euphorbia garanbiensis*** HAYATA sp. nov. Perennis; rhizoma incrassatum; caulis diffusus a basi ramosissimus, ramis humifusis 10–15 cm. longis glabris. Folia opposita oblique rotundato-ovata 8 mm. longa totiusque lata apice obtusissima basi valde oblique cordata margine integra vel obscure serrulata nervoso-marginata, textura crassiuscula, subsessilia, vel petiolis 1 mm. longis, stipulis interpetiolaribus cuspidiformibus  $\frac{1}{2}$  mm. longis. Cyma axillaris. Involucrum semiglobosum 1 mm. longum 2 mm. latum glabrum, glandulis 4 late rotundatis 1 mm. latis, appendiculis reniformibus  $1\frac{1}{2}$  mm. latis integris, pedunculis 5 mm. longis; bracteolis intra involucrum linearibus laceratis  $\frac{1}{2}$  mm. longis. Fl. ♂: anthera didynama, connectivis haud productis. Fl. ♀: ovarium glabrum læve, stylis 3 apice furcatim lobatis.

HAB. Garanbi, leg. B. HAYATA, Juni. 1912.

Near *E. sanguinea* STEUD.; but differs from it in the presence of petaloid appendages of glands.

***Euphorbia liukiensis*** HAYATA sp. nov. Perennis; caulis humifusus, ramis diffusis glabris. Folia opposita elliptica 6–7 mm. longa 4 mm. lata apice obtusissima vel rotundata basi oblique cordata margine subintegra versus apicem obscure serrulata, textura tenuiter incrassata, utraque glabra, petiolis 1 mm. longis, stipulis interpetiolaribus digitatim fissis brevissimis. Cyma axillaris. Involucrum obconicum 1 mm. longum totiusque latum glabrum; glandulis 4, appendiculis integris  $\frac{1}{2}$  mm. latis; lobis involucri triangularibus laceratis; bracteolis intra involucrum linearibus laceratis. Capsula 3-cocca, coccis semi-ovatis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis lævibus. Semina levia 1 mm. longa angulato-ovoidea.

HAB. Yonakuni, leg. Y. SHIMADA, Oct. 1917.

Near *Euphorbia sanguinea* STEUD.; but differs from it in the presence of the appendage of glands.

***Euphorbia Peplus* LINN.; DUNN et TUTCHER, Fl. Kwantung et Hongk. p. 232.**

HAB. Tamsui.

**Euphorbia Tashiroi** HAYATA sp. nov. Caulis humifusus a basi ramosus, ramis 20–30 cm. longis tenuiter hirsutis. Folia opposita elliptica 13 mm. longa 7 mm. lata apice obtusissima basi oblique truncata vel tenuiter cordata margine obscure serrulata supra glabra subtus hirsuta, textura herbacea, petiolis 1–2 mm. longis hirsutis, stipulis interpetiolaribus 2-fidis, segmentis cuspidato-triangularibus  $\frac{1}{4}$  mm. longis laceratis. Cyma axillaris 7 mm. longa hirsuta. Involucrum obconicum  $\frac{1}{2}$  cm. longum glabrum, glandulis 4, appendicibus integris. Capsula tricocca, coccis hirsutis oblique ovoideo-oblongis  $1\frac{1}{4}$  mm. longis. Semina angulato-ovoidea apice obtuso-acuta basi truncata lævia fusca minus quam 1 mm. longa.

*Euphorbia hypericifolia* HAYATA Gen. Ind. Fl. Formos. p. 66, (non LINN.).

*Euphorbia humifusa* HAYATA Gen. Ind. Fl. Formos. p. 66, (non WILLD.).

HAB. Tarimukoi, leg. Y. TASHIRO, Aprili. 1895; Akō, leg. Y. SHIMADA, Mai. 1915.

Near *E. hypericifolia* LINN.; but distinguishable from it in having hirsute capsules.

## Urticaceæ.

### *Zelkova* SPACH.

**Zelkova formosana** HAYATA sp. nov. (Fig. 33-1, 2.) Arbor; ramuli fusco-purpurascens glabri. Folia in magnitudine variabilissima alterna chartacea vel tenuiter coriacea lanceolata 2–10 cm. longa 1–3 $\frac{1}{2}$  cm. lata apice obtusa vel acuminata basi obtusa vel obtusissima margine serrata supra tenuissime hirsuta subtus subglabra, venis lateralibus parallelis rectis ad apicem serrarum attingentibus, petiolis 2–8 mm. longis. Flores ignoti. Achænia 3 mm. longa totiusque lata reticulato-rugulosa utroque latere prominente carinata.

*Zelkova acuminata* HAYATA Gen. Ind. p. 71, (non PLANCH.)

HAB. Fukkishō, Biōritsu-Taiko.

Resembles closely *Z. acuminata*, but distinguishable from it in the less prominent edges of the achenes.

**Zelkova tarokoensis** HAYATA sp. nov. (Fig. 33-3, 4.) Arbor; ramuli



glabri fusco-purpurascens gracillimi. Folia ovato-oblonga vel oblonga chartacea 2-3 cm. longa 10-13 mm. lata apice obtusa basi obtusissima rotundata margine serrata vel serrulata utraque glabra, petiolis 2-3 mm. longis glabris.

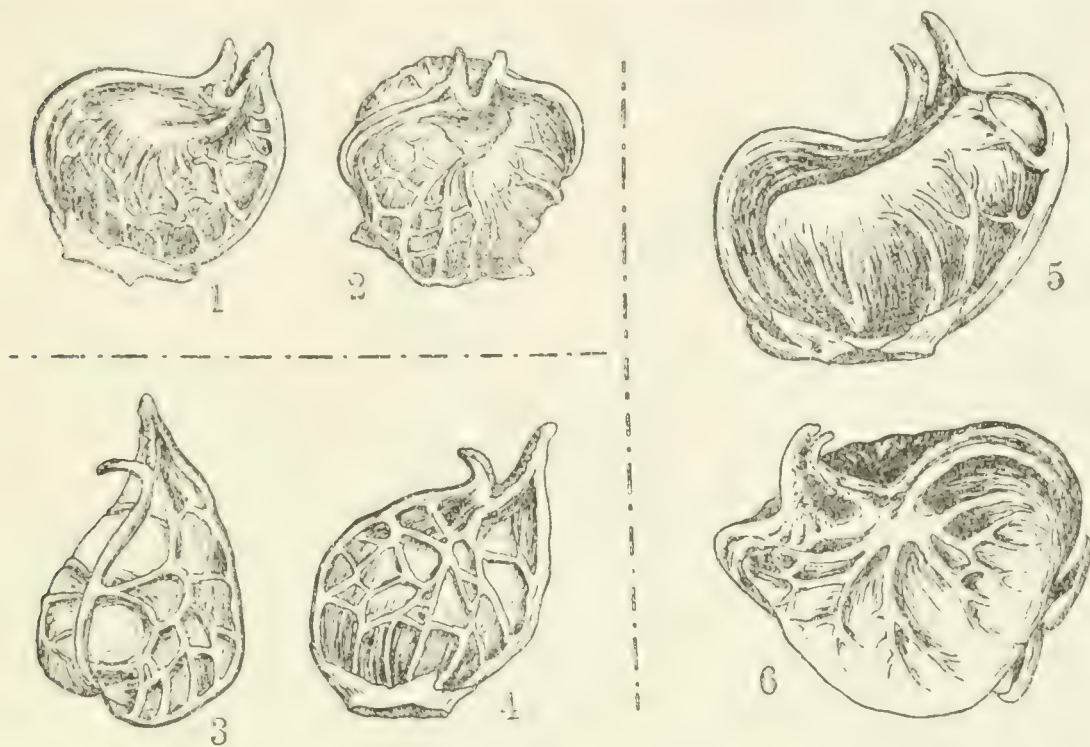


Fig. 33; 1-2, *Zelkova formosana* HAYATA; 3-4, *Z. tarokoensis* HAYATA; 5-6, *Z. acuminata* PLANCH. Achenes, seen from different sides.

Flores ignoti. Achænia solitaria axillaria obliqua 3 mm. longa ruguloso-reticulata stigmatibus 2-fidis terminata utroque latere carinata basi latere uno profunde sulcata circ. 2-lobata.

HAB. Uchitaroko, leg. Y. MATSUDA.

Near *Z. acuminata*, but differs from it in the much smaller leaves and in the achenes which are 2-lobed on one side.

### *Morus* LINN.

***Morus acidosa*** GRIFFITH Not. Pl. Asia. IV. (1854) p. 388; KOIDZUMI Sōzoku-shokubutsu-kō, p. 34, t. 4.

*Morus alba* HAYATA Gen. Ind. p. 70, (non LINN.)

HAB. Arisan, Keitao, Suisha.

## Cupuliferæ.

*Lithocarpus* BLUME.

**Lithocarpus Nakaii** HAYATA sp. nov. (Fig. 34). Arborescens. Ramuli



Fig. 34; *Lithocarpus Nakaii* HAYATA; 1, a branch; 2, fruits.

glauco-fuscentes vel cinerascetes. Folia chartacea vel tenuiter coriacea oblongo-lanceolata vel oblanceolata 10–12 cm. longa 2–3½ cm. lata apice subito caudato-acuminata, acuminibus 1½ cm. longis 3 mm. latis ad summum obtusis,



Fig. 35; *Lithocarpus Matsudai* HAYATA; 1, a branch; 2, a cup; 3, a portion of the cup; 4, a gland; 5, the same, seen from above.



basi cuneato-attenuata margine integra, costis venis supra laud vel vix elevatis subtus prominente distincte elevatis, venis lateralibus gracillimis distinctis, petiolis 1–1½ cm. longis tenuissime alatis. Fructus spicatin dispositi. Cupulæ subplanæ plus minus concavæ 1½ cm. in diametro depresso-brevissimo-villosæ, cicatricibus centralibus prominente elevatis 7 mm. in diametro. Glandes castaneæ depresso-globosæ 16 mm. in diametro 13 mm. longæ apice plus minus depressæ.

HAB. Dainan-ō, leg. S. NAKAI.

Near *L. nantoensis* HAY., but differs from it in the leaves which have prominently elevated costas and veins on the under side. In *L. nantoensis* the costas and veins of the leaves are not at all elevated on the under surface.

**Lithocarpus Matsudai** HAYATA sp. nov. (Fig. 35.) Arbor; ramuli graciles lenticellis minutis dense conspersi. Folia alterna coriacea elongato-oblonga 7–10 cm. longa 3–4 cm. lata apice acuta summo obtusa basi acuta ad petiolum abeuntia margine integerrima, costa supra subtusque prominente elevata, venis gracillimis, utraque pagine glabra, petiolis 1½ cm. longis. Fructus spicatin dense dispositi et aggregati sessiles. Cupulæ plano-obconicæ 12 mm. in diametro 5 mm. longa extus dense squamatae, squamis adpressis minutis late triangularibus; glans globoso-trigono-pyramidalis 18 mm. longa 15 mm. lata glabra apice breve apiculata pallido-fulvescens.

HAB. Arikō-Banchi, leg. Y. MATSUDA, Mart. 1917.

Near *L. subreticulata* HAY., but differs from it in the much broader leaves and in the cups which are beset with triangular scales, but not ringed.

## Coniferæ.

**Abies Kawakamii** (HAYATA) T. ITÔ Encyclopædia Japonica II. p. 167; HAYATA Gen. Ind. p. 74.

## Orchideæ.

### *Dendrobium* Sw.

**Dendrobium alboviride** HAYATA sp. nov. (Fig. 36). Caulis erectus 25 cm. longus, internodiis claviformibus 3–4 cm. longis sursum 8 mm. latis-

multi-sulcatis vaginis foliorum usque ad medium obtectis in exsiccato flavescentibus. Folia oblongo-lanceolata coriacea 5–8 cm. longa  $1\frac{1}{2}$ –2 cm. lata apice obtusissima ad apicem inæqualiter 2-lobulata basi gradatim ad vaginas attenuata 9–10-nervia glabra integra, vaginis 2 cm. longis cylindricis. Flores quasi-axillares quasi-solitarii, pedicellis (cum ovariis) 2–3 cm. longis basi bracteis instructis. Flores albi  $4\frac{1}{2}$  cm. in diametro, columna cum pede viridi. Sepalum posticum lineari-oblongum  $2\frac{1}{2}$  cm. longum 8 mm. latum apice obtusissimum glabrum basi plus minus contractum integrum, lateralia valde obliqua basi cum pede columnæ connata mentum 8 mm. formantia. Petala oblonga  $2\frac{1}{2}$  cm. longa 17 mm. lata apice rotundata basi plus minus contracta. Labellum obovato-oblongum  $2\frac{1}{2}$  cm. longum  $1\frac{1}{2}$  cm. latum apice rotundatum basi subito unguiculatum, ungue 3–4 mm. longo 3 mm. lato, supra pagine dense hirsutum. Columna brevissima 3 mm. longa, pede 9 mm. longo cum sepalis mentum formanti.



Fig. 36; *Dendrobium alboviride* HAYATA.

HAB. Kappanzan, leg. B. HAYATA et S. SASAKI, Juli. 1917.

Near *Dendrobium Linawianum*, but differs from it in having white flowers.

### *Bulbophyllum* THOU.

***Bulbophyllum Sōmai*** HAYATA sp. nov. (Fig. 37). Epiphytica; caulis repens gracillimus teres 1 mm. in diametro sectionis glaber remote foliatus. Folia crassissima oblonga 13 mm. longa 6–7 mm. lata apice obtusa basi obtusa vel acuta, petiolis 2 mm. longis. Flores axillares solitarii longe pedunculati, pedunculis 3–4 cm. longis, bracteis 2–3 vaginiformibus apice acutis hyalinis fœciosus. Sepala æquiformia lineari-lanceolata; posticum 18 mm. longum 3 mm. latum apice acuminatum basi plus minus dilatatum glabrum; lateralia æquiformia basi dilata cum pede columnæ connata mentum 2–3 mm. longum formantia. Petala ovato-oblonga 3 mm. longa 2 mm. lata apice acuta. Labellum ovato-oblongum 4 mm. longum  $2\frac{1}{2}$  mm. latum apice obtusum basi

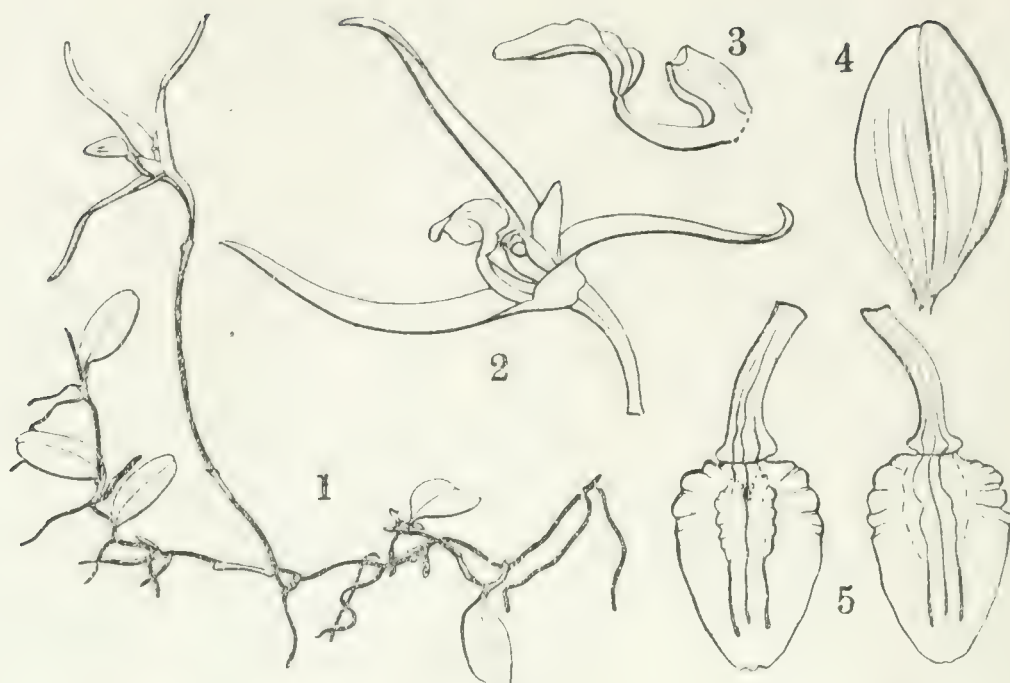


Fig. 37; *Bulbophyllum Somai* HAYATA; 1, the plant; 2, a flower; 3, column, foot and lip; 4, a petal; 5, a lip, with a columnal foot, seen from different sides.

cum pede columnæ longe producto articulatum integrum supra basin subito plicato-reflexum paralleliter 3-nerviis, discis 2-linearibus medio labelli dispositis. Columna 1 mm. longa basi alata, pede longissimo ultra mentum longe producto.

HAB. Uraisha, leg. T. SŌMA, Juli. 1916.

Near *Bulbophyllum Drymoglossum* MAXIM.; but distinguishable from it in the much longer and narrower sepals.

### *Eria* LINDL.

***Eria Matsudai*** HAYATA sp. nov. Epiphytica. Pseudobulbi oblongi  $1\frac{1}{2}$  cm. longi recurvi approximativè connexi. Caulis e basi pseudobulbi (anotini) oriundus  $1\frac{1}{2}$  cm. longus squamis obtectus apice 2-foliatus. Folia lanceolata vel oblanceolata 8 cm. longa 18 mm. lata apice acuta basi attenuata sessilia integra crassiuscula in exsiccato membranacea glabra ex apice caulis geminatim criunda. Racemi ex apice caulis oriundi pedunculati, pedunculis 2–3 cm. longis tenuiter floccoso-hirsutis, 2–4-florati, bracteis ovatis 5 mm. longis  $2\frac{1}{2}$  mm. latis apice acutis sessilibus glabris, pedicellis 6–7 mm. longis, ovariis



obconico-cylindricis 6 mm. longis fulvo-hirsutis. Sepalum lineari-oblongum 9 mm. longum 2 mm. latum apice obtusum; lateralia triangulari-lineari-oblonga falcata 8 mm. longa basi dilata 5 mm. lata pede columnæ connata mentum  $4\frac{1}{2}$  mm. longum formantia. Petala linearia 8 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa. Labellum cum ungue 8-9 mm. longum; lamina in ambitu obtriangularis 6 mm. lata 3-lobata, lobis lateralibus linearibus  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis, lobo centrali rotundato 3 mm. longo totiusque lato apice obtuso basi contracto, discis duobus versus basin laminæ usque ad medium unguis extensis linearibus. Columna 3 mm. longa columniformis, pede  $4\frac{1}{2}$  mm. longo.

HAB. Rarazan, leg. Y. MATSUDA, Juli. 1918.

Near *Eria arisanensis* HAY.; but distinguishable from it in having much thinner and larger leaves and in the longer unguiculate base of the lips.

### *Calanthe* R. BR.

***Calanthe Takeoi*** HAYATA sp. nov. Terrestis; caulis erectus 20-30 cm. longus basi vaginatus versus apicem foliatus glaber. Folia in exsiccato membranacea lanceolata 30-40 cm. longa 5 cm. lata apice acuminatissima basi attenuata ad vaginam abeuntia integra utraque pagine glabra. Caulis florifer e basi caulis foliiferi oriundus erectus 25 cm. longus simplex glaber teres cum floribus 25 cm. longus apice flores 4-5 racemosim gerens, bracteis ovato-lanceolatis 8-10 mm. longis acutis, pedicellis cum ovariis 2- $2\frac{1}{2}$  cm. longis glabris. Sepala æqualia lanceolata apice obtusa 3 cm. longa 8 mm. lata basi haud vel vix contracta glabra. Petala oblanceolata 3 cm. longa 8 mm. lata apice obtusa basi angustata glabra. Labelli unguis cum basi columnæ connatus tubum latum formans; lamina rotundata  $2\frac{1}{2}$  cm. in diametro apice late truncata emarginata basi contracta versus apicem tenuissime 3-lobata margine plicato-undulata, discis secus medium labelli 2-striatim dispositis, unguibus basi calcaratis, calcaribus obconicis 8-9 mm. longis basi subito breve caudatis recurvatis. Columna 15 mm. longa validiuscula facie anteriore hirta.

HAB. Tōyenchō: Urai, leg. TAKEO ITŌ, Oct. 1917.

Near *C. Kawakamii* HAY.; but differs from it in having much smaller

flowers with much shorter spurs.

***Calanthe forsythiiflora*** HAYATA Ic. Pl. Formos. IV. p. 67. Descriptio aucta: Fructus longe racemosi, racemis 30 cm. longis, pedicellis  $1\frac{1}{2}$  cm. longis gracilibus glabris deorsum recurvis descendentibus. Capsula pendula ovoidea vel obovoidea 12 mm. longa 6–7 mm. lata glabra elevato-striata.

HAB. Uraisha, leg. Y. SHIMADA, Aprili. 1918.



Fig. 38; *Calanthe Matsudai* HAYATA;  
1, a flower; 2, a lip.

***Calanthe Matsudai*** HAYATA sp. nov. (Fig. 38 et 39). Herba, radicibus incrassatis. Caulis scapiformis 100 cm. longus erectus simplex teres tenuissime pubescens sursum ad racemum abeuns efoliatus. Folia omnia fasciculata ex apice pseudobulbi oriunda linearia 60 cm. longa 1 cm. lata apice acuminata glabra membranacea. Racemi 25 cm. longi dense florati, bracteis linearibus post anthesin auctis 1–3 cm. longis acuminatis, pedicellis 4 mm. longis tenuiter hirsutis, ovariis clavato-cylindricis 8–9 cm. longis. Sepala

reflexa oblongo-obovata 8 mm. longa  $3\frac{1}{2}$  mm. lata apice acuta basi plus minus contracta 3-nervia glabra. Petala spathulato-linearia 8 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusissima basi attenuata 3-nervia glabra. Labellum in ambitu late triangulare 12 mm. latum 6–7 mm. longum, lobis lateralibus valde divaricatis oblongis 5–6 mm. longis 3 mm. latis apice obtusis basi latere exteriori lobulo instructis, lobo terminali in ambitu obtriangulati 4 mm. longo medio sursum divaricatim 2-lobato, lobis linearibus divaricatis 4 mm. longis 1 mm. latis apice obtusis. Discus cristaeformis ad basin medii labelli dispositus 3-seriatus lobulatus, lobulis lamellatis. Columna valida 2 mm. longa basi longe calcarata, calcar 1 cm. longo 1 mm. lato.

HAB. Rarazan, leg. Y. MATSUDA, Juli. 1918.



Fig. 39; *Colanthe Matsudai* HAYATA.



Somewhat near *C. gracilis*, but greatly different from it in having much smaller flowers, narrower sepals and in the much longer narrower bracts.

*Vanilla* Sw.

***Vanilla ronçensis*** HAYATA sp. nov. Scandens; caulis flexuosus glaber. Folia coriacea alterna obovato-oblonga 20 cm. longa 7 cm. lata apice subito acuta basi obtusissima integra utraque pagine glabra, nervis venis venulis utraque pagine elevatis, petiolis  $1\frac{1}{2}$  cm. longis. Flores quasi-axillares solitarii vel racemosi, pedicellis cum ovario 3–4 cm. longis. Petala sepalaque basi connata haud patentia. Perianthium in ambitu campanulatum. Sepala aequalia oblanceolata 4 cm. longa 1 cm. lata apice acuto-obtusa basi longe attenuata. Petala quam sepalis angustiora 4 cm. longa 8 mm. lata apice obtusa basi angustiora. Labellum  $3\frac{1}{2}$  cm. longum basi cum columna connatum et columnam toto amplexans, in explicato obtriangulare apice truncatum ad centrum lobulo uno instructum apice medio cristatum, cristis 2-seriatim dispositis, discis linearibus secus medium 2-seriatim dispositis, medio fasciculis pilorum duobus instructum, pilis fere connatis 7 mm. longis rectis, latere margine planum integrum, apice margine crispatum cæterum glabrum. Columna elongata fere 3 cm. longa in labello inclusa glabra.

HAB. Inter Rōnō et Kōsenpo, leg. B. HAYATA, Aprili. 1917.

Near *Vanilla Somai*, but differs from it in having two bundles of hairs on the hypochil of the lips.

*Galeola* Lour.

***Galeola Matsudai*** HAYATA sp. nov. Terrestis aphylla; caulis circ. 100 cm. longus erectus teres glaber, squamis alternatim remote dispositis oblongis 3–4 cm. longis 1–2 cm. latis acutis glabris; caulis simplex apice flores racemosim gerens. Racemi 18 cm. longi fulvo-floccosi vel glabrati, bracteis oblongis 1–2 cm. longis, pedicellis cum ovariis cylindricis 1– $1\frac{1}{2}$  cm. longis. Sepala aequalia oblonga 18 mm. longa 7–8 mm. lata apice acuto-obtusa basi plus minus contracta extus fulvo-floccosa intus glabra patentia. Petala oblongo-lanceolata  $1\frac{1}{2}$  cm. longa 6 mm. lata glabra apice acuto-obtusa basi plus minus contracta integra. Labellum rotundatum  $1\frac{1}{2}$  cm. in diametro valde



Fig. 40; *Gastrochilus Matsudai* HAYATA; 1, the plant; 2, a flower, seen from below; 3, a lip and column; 4, a dorsal sepal; 5, a lateral sepal; 6, a petal; 7, pollinia on a caudicle; 8, the same, with an operculum.

conceavum margine eroso-fimbriatum apice obtusissimum basi contractum sessile. basi columnæ adnatum pagine supra dense cristato-pilosum subtus glabrum. Columna 7 mm. longa; operculum floccoso-hirsutum.

HAB. Akōchō: Paiwan, Juni. 1917.

Near *Galeola Lindleyana* REICH. f. (KING. t. 352); but differs from it in having much more hirsute lips.

### *Gastrochilus* DON.

***Gastrochilus Matsudai*** HAYATA sp. nov. (Fig. 40). Epiphytica ad substratum toto adpresse prostrata glabra. Folia alterna distichè disposita lineari-lanceolata 3 cm. longa  $3\frac{1}{2}$  mm. lata apice obtusa glabra costa, supra impressa subtus elevata, crassiuscula basi haud vel vix contracta cum vaginis articulata, vaginis 3 mm. longis glabris. Racemi oppositifolii vel quasi-axillares 2 cm. longi 3-4-florati, pedicellis divaricatis cum ovariis 4-5 mm. longis glabris. Flores 8-9 mm. in diametro. Sepalum posticum obovatum valde conceavum 5-6 mm. longum 3 mm. latum apice obtusissimum basi haud vel vix contractum, lateralia oblonga fere conformia. Petala obovato-oblonga 5 mm. longa valde concava glabra. Labellum in ambitu triangulare, lamina 6-7 mm. lata apice rotundata medio apicis retusa pagine supra toto barbata, disco calloso medio labelli insito; labellum basi calcaratum, calcare triangulari 3 mm. longo ad orem 2 mm. lato. Columna brevissima 1 mm. longa.

HAB. Mt. Daibusan, Nov. 1918, leg. Y. MATSUDA.

Near *Gastrochilus fuscopunctatus* HAY., but distinguishable from it in the much narrower sepals and petals and in the much broader epichilus of the lips.

### *Anæctochilus* BLUME.

***Anæctochilus koshunensis*** HAYATA Ic. Pl. Formos. IV. p. 105.

HAB. Daibuzan, leg. Y. MATSUDA, Nov. 1918.

### *Orchis* LINN.

***Orchis kiraishiensis*** HAYATA sp. nov. (Fig. 41). Herba humilis. Caulis simplex 15 cm. longus basi vaginis 1-2 instructus glaber erectus medio alternatim 2-foliatus apice racemosim 2-3-floratus. Folia lineari-lanceolata.



4-5 cm. longa 8 mm. lata apice acuta vel acuminata integra glabra basi haud attenuata ad vaginas abeuntia, veginis glabris cylindricis  $1\frac{1}{2}$  cm. longis. Flores albo-rosacei patentes  $2\frac{1}{2}$  cm. in diametro, pedicellis brevibus cum ovariis fusiformibus 1 cm. longis. Sepalum posticum 8 mm. longum 3 mm. latum



Fig. 41; *Orchis kiraishiensis* HAYATA; 1, the plant; 2, a flower, sepals and petals taken off; 3, a lip; 4, a dorsal sepal; 5, a lateral sepal; 6, a petal.

oblongum apice acutum basi plus minus contractum; lateralia obliqua ovato-oblonga falcata 8-9 mm. longa  $3\frac{1}{2}$  mm. lata apice obtusa dorso apice minute cornuta glabra. Petala glabra minora ovato-oblonga 6 mm. longa 3 mm. lata apice obtusa basi latere anteriore subauriculata latere posteriore basi acuta. Labellum basi longe calcaratum, lamina in ambitu obtriangularis 13 mm. longa 15 mm. lata apice leviter 3-lobata, lobo centrali 5 mm. longo totiusque lato apice truncato medio sinuato ad centrum sinus lobulo uno triangulari breve aristato instructo, calcare 9 mm. longo ad orem triangulari-dilato 3 mm. lato. Columna 3 mm. longa erecta plus minus posteriore recurva.

HAB. Kiraishizan, ad 10,000 ped. alt., leg. S. OHASHI, Aug. 1918.

Near *O. pauciflora* FISCH.; but differs from it in having sessile lips. The genus is new to the flora of Formosa.

## Scitamineæ.

### *Alpinia* LINN.

***Alpinia agiokuensis*** HAYATA sp. nov. Rhizoma repens squamis rotundato-ovatis dense obtectum, squamis  $1\frac{1}{2}$  cm. longis latioribus quam longis rhizomatem amplexantibus. Caulis cum inflorescentia 100-80 cm. longus dense brevique villosus erectus basi squamis 3-4 obtectus, squamis 3-15 cm. longis extus dense villosis intus glabris. Folia 2-3, ligulis 2-lobatis villosis 2-3 mm. longis, petiolis 3 cm. longis, lamina oblongo-lanceolata 38 cm. longa 6 cm. lata apice acuminata supra parce subtus dense villosa apice cuspidato-acuminata basi longe attenuata. Spicæ terminales solitariae 10 cm. longæ, pedunculo 7-8 cm. longo villosus basi bractea singula instructo, bractea linearilanceolata 5-15 cm. longa  $1-2\frac{1}{2}$  cm. lata apice cauda lineari 2-3 cm. longa instructa extus villosa intus glabra. Flores fere sessiles extus tenuiter villosi basi bracteolis minutis oblongis obtusis villosis instructi; ovarium villosum obovoideum 2 mm. longum; calyx cylindricus 11 mm. longus 5 mm. latus extus tenuiter villosus apice 3-lobatus; corollæ tubus cum calyce æquilongus 11 mm. longus medio 2 mm. apice 3 mm. latus extus intusque parce hirsutus, lobis 3 æqualibus spathulatis valde concavis extus villosis intus glabris apice rotundatis; labellum extus glabrum intus hirsutum.

sessile obovatum 9 mm. longum apice breve 2-lobatum, lobis minutis se divaricatis, margine deorsum integrum sursum denticulatum, basi utroque latere staminodiis instructum, staminodiis lineari-lanceolatis 6 mm. longis 1 mm. latis glabris; stamen ultra tubum corollæ 15 mm. exsertum; filamentum ultra tubum corollæ 8 mm. longo glabro, anthera 6 mm. longa secus medium plicata stylum amplexantem, connectivo latiore in explicato 3 mm. lato; stylo glabro, stigmate terminali infundibuli-formi 1 mm. lato margine pectinato-ciliolato.

HAB. Agioku, leg. B. HAYATA, Mai. 1916, ad. 1,200 ped. alt.

Near *A. japonica*, but differs from it in having a little smaller flower with no distinct macuration on the lips, and in the presence of a large bract at the base of the spikes.

NOTE: Calyx and corolla reddish towards the tip; anthers white.

***Alpinia densespicata*** HAYATA sp. nov. Folia superiora fere sessilia vel breve petiolata lanceolata 60–70 cm. longa 10 cm. lata apice acuminata basi attenuata ad marginem hirsuta utraque pagine glabra, ligulis 2-lobatis apice dense hirsutis. Spicæ rachis florifera 15 cm. longa fulvo-sericeo-villosa densissime florifera; bracteis late obovatis 15 mm. longis 13 mm. latis apice obtusissimis rotundatis; ovarium subglobosum 3 mm. longum 2 mm. latum dense tomentosum; calyx cylindrico-campanulatus 12 mm. longus 5 mm. latus irregulariter 2–3-dentatus uno latere plus minus fissus vel haud fissus margine basi extusque plus minus hirsutus; petala 3 basi ad 1 cm. altitudinem connata  $2\frac{1}{2}$  cm. longa dorsale, latius  $1\frac{1}{2}$  cm. latum margine ciliolatum apice late rotundatum, lateralia angustiora; labellum late ovato-rhomboideum sessile  $1\frac{1}{2}$  cm. longum totiusque latum margine eroso-denticulatum; anthera 8–9 mm. longa 4 mm. lata apice 2-lobata; stylo sursum hirsuto; stigmate infundibuli-formi margine extusque dense hirsuto.

HAB. Shichiseitonzan, leg. S. SASAKI, Mart. 1910.

Near *A. macrocephala*; but differs from it in the total absence of the bracts in the fruiting spikes.

***Alpinia dolichocephala*** HAYATA sp. nov. Folia superiora lanceolata sessilia 70–90 cm. longa 10–12 cm. lata apice subito et abrupte caudata, caudis brevibus circ. 1 cm. longis, basi subito attenuata margine brevissime hirsuta utraque pagine glabra, ligulis elobatis vel 2-lobatis obtusis extus villosis.



Spicæ rhachis florigera 15 cm. longa fulvo-sericeo-villosa dense florigera; bracteis 3 cm. longis subconchiformibus in explicato  $2\frac{1}{2}$  cm. latis apice subrotundatis ad medium arista hirsuta una 1–2 mm. longa instructis margine et basi hirsutis; floribus sessilibus; ovarium subglobosum 2 mm. longum totiusque latum dense villosum; calyx subcylindricus 2 cm. longus 8 mm. latus uno latere a basi usque ad 5 mm. altitudinem fissus apice obtusissimus mucronatus extus brevissime hirsutus intus glaber; petala 3 a basi usque ad 1 cm. altitudinem connata; dorsale latius 2– $2\frac{1}{2}$  cm. latum valde concavum erectum cuculliforme glabrum sursum margine hirsutum apice rotundatum ad centrum breve mucronatum; lateralia angustiora 8 mm. lata apice rotundata valde concava; labellum late rhomboideum 4 cm. longum totiusque latum sessile apice triangulare obtusum ad summum 2-lobatum margine eroso-denticulatum basi ad faucem glabrum haud hirsutum albicans, versus medium purpureo-striatum; staminodia 0; stamen erectum vel plus minus arcuatum, filamentum glabrum; anthera linearis 1 cm. longa, connectivo dorso carinato apice breve 2-lobato; stylus glaber; stigmatum plus minus hirsutum. Spica fructifera 20–30 cm. longa dense fructifera, fructibus globosis  $1\frac{1}{2}$  cm. in diametro brevissime hirsutis, seminibus tetrahedriformibus 4 mm. longis arillis membranaceis albis obtectis.

HAB. Inter Rōnō et Kosenpo, leg. B. HAYATA, Aprili. 1915.

Near *Alpinia macrocephala* HAY.; but distinguishable from it in the much longer spikes and in the total absence of the bracts in the fruiting spikes.

**Alpinia Elwesii** Bot. Mag. t. 8,651.

**Alpinia Galanga** WILLD.; HAYATA Gen. Ind. p. 82.

HAB. Taihoku (cult.), leg. S. SAWADA, Juli. 1914.

**Alpinia hokutensis** HAYATA sp. nov. Caulis  $1\frac{1}{2}$  mm. altus. Folia superiora lanceolata circ. 50 cm. longa 7–8 cm. lata apice gradatim acuminata basi attenuata margine hirsuta utraque pagine glabra, ligulis apice rotundatis elobatis ciliolatis. Spicæ erectæ vel inclinatæ, partibus florigeris 15–20 cm. longis laxè floratis glabris, pedicellis subglabris 1 cm. longis; bracteis conchiformibus glabris  $1\frac{1}{2}$  cm. longis apice obtusissimis alabastrum floris amplexantibus; ovarium globosum 2 mm. longum  $1\frac{1}{2}$  mm. latum brevissime hirsutum; calyx cylindricus 1 cm. longus glaber apice 3–5-dentatus. Petala

3, 2 cm. longa basi usque ad 1 cm. altitudinem connata glabra; dorsale latius 1 cm. latum apice rotundatum valde concavum; lateralia 7 mm. lata apice rotundata; labellum late ovato-rotundatum 18 mm. longum totiusque latum apice rotundatum margine crispato-crenulatum glabrum flavum medio rubescens basi ad faucem tenuiter hirsutum; stamen arcuatum, parte libera filamenti 1 cm. longa; anthera 5 mm. longa; connectivo latiore in explicato 3 mm. lato crassiusculo breve hirsuto-plicato apice externe reflexo 2-3-denticulato; stylus glaber, stigmatе infundibuliformi plus minus hirsuto.

HAB. Shichiseitonzan, leg. Y. SHIMADA, ad 300 ped. alt.; Hokuto, leg. Y. SHIMADA, Mai. 1917, (typus!).

Near *Alpinia Schumanniana* VAL.; but differs from it in the much smaller flowers with distinct staminodes.

**Alpinia Kawakamii** HAYATA Ic. Pl. Formos. V. p. 222; Gen. Ind. p. 82.

HAB. Sōseikyaku, leg. B. HAYATA, Mai. 1916.

NOTE: Leaves very dark green above, villose beneath; flower-buds light pink.

**Alpinia kelungensis** HAYATA Ic. Pl. Formos. V. p. 216, Fig. 76-C., Gen. Ind. p. 82.

HAB. Kelung, Heirinbi, Agioku, Ōchōbi.

NOTE: 2-3 m. tall; leaves dark green, shining above; pedicels reddish; ovary green; fruits scarlet.

**Alpinia kushakuensis** HAYATA sp. nov. Folia superiora lanceolata circ. 50 cm. longa 10 cm. lata apice subito acuminata basi attenuata breve petiolata vel sessilia utroque pagine glabra sed ad marginem brevissime villosa, ligulis 8 mm. longis extus brevissime villosis intus glabris 2-lobatis, lobis obtusissimis. Spicæ densiuscule florigeræ 15 cm. longæ; rhachis 15 cm. longa dense villosa, floribus subsessilibus vel breve pedicellatis. Ovarium dense villosum cylindrico-obovoideum 1 cm. longum 5 mm. latum; bracteis conchiformibus  $2\frac{1}{2}$ -3 cm. longis apice 2-3-dentatis in explicato  $2\frac{1}{2}$  cm. latis glabris apice et margine plus minus hirsutis; calyx obconico-cylindricus 2 cm. longus extus basi hirsutus ab apice usque ad medium fissus apice obtusissimus; petala 3-4-5 cm. longa a basi usque ad 1 cm. altitudinem connata; dorsale latius obovato-spathulatum  $1\frac{1}{2}$  cm. latum apice plus minus hirsutum; lateralia

angustiora; labellum basi cum petalo connatum, parte libera (lamina) ovato-rhomboidea 4–4½ cm. longa 3 cm. lata apice longe caudata, cauda 1 cm. longa, margine subintegra apice ad summum obtusa haud lobata utraque pagine glabra medio carinata margine flava versus medium rubescente margine eroso-denticulata basi intus densissime tomentosa, utroque latere staminodio lineari 4–5 mm. longo instructa. Stamen erectum vel recurvum 4 cm. longum a basi usque ad 1½ cm. cum petalis labelloque connatum; anthera late lineari 1½ cm. longa 7 mm. lata, connectivo incrassato brevissime villosa apice 2-lobato; stylo 4–5 cm. longo glabro, stigmate infundibuliformi hirsuto.

HAB. Kussaku, leg. B. HAYATA, Mai. 1916.

Near *A. uraiensis* HAY.; but differs from it in the much smaller flowers with much narrow anthers.

***Alpinia macrocephala*** HAYATA Ic. Pl. Formos. V. p. 222; Gen. Ind. p. 82.

HAB. Arisan: Inter Keitao et Goshōrin, leg. B. HAYATA, ad 4,000–6,000 ped. alt., Aprili. 1916; inter Funkiko, Karapin et Taroyen.

Very remarkable in the presence of large bracts embracing the fruits in the basal portions of the spikes.

***Alpinia mediomaculata*** HAYATA sp. nov. Caulis 1–2 m. altus. Folia superiora sessilia lanceolata 46 cm. longa 7 cm. lata apice acuminata basi acuta utraque glabra margine parce hirsuta, ligulis 2-lobatis extus hirsutis intus glabris. Spicæ rhachis florifera 10–15 cm. longa fulvo-villosa dense florigera, floribus sessilibus vel brevissime pedicellatis; bracteis obovatis 2 cm. longis 1 cm. latis basin alabastri floris amplexantibus apice obtusis plus minus hirsutis vel glabris; floribus sessilibus; ovarium obconico-cylindricum 3 mm. longum 2 mm. latum breve tomentosum; calyx obconico-cylindricus 12 mm. longus 5 mm. latus basi extus plus minus hirsutus sursum glaber apice 2–3-lobatus ad marginem loborum ciliolatus uno latere ab apice usque ad medium fissus; petala 3; 4 cm. longa a basi usque ad 1 cm. altitudinem connata; dorsale latius 1½ cm. latum apice obtusissimum margine hirsutum; lateralia angustiora 7 mm. lata; labellum late ovato-rhomboideum sessile 2½–3 cm. longum 3 cm. latum apice breve 2-lobatum margine sursum eroso-denticulatum deorsum integrum ad basin circum tubum dense hirsutum versus marginem.



subalbum medio rubrum. Stamen: flamenti parte libera 6-7 mm. longa complanata brevissime hirsuta; anthera linearis 11 mm. longa 4 mm. lata apice 2-lobata; stylus  $2\frac{1}{2}$  cm. longus glaber, stigmatibus infundibuliformi hirsuto. Spica fructifera 25 cm. longa, fructibus globosis 13 mm. longis tenuiter hirsutis, seminibus tetrahedriformibus  $3\frac{1}{2}$  mm. longis.

HAB. Inter Rahao et Tonroku, leg. B. HAYATA, Mai. 1916.

Near *Alpinia macrocephala* HAY.; but separable from it in total absence of bracts in the fruiting spikes; also near *A. densespicata*, but differs from it in the quite smooth (not costulate) fruits.

NOTE: Plant 1-2 m. tall; bracts and sepals pink or white; fruits orange-scarlet.

**Alpinia Shimadai** HAYATA Ic. Pl. Formos. V. p. 219. Description aucta:—Spica fructifera circ. 10 cm. longa 3-4 cm. lata, fructibus globosis 13 mm. in diametro minute hirsutis plus minus costulatis; calycibus persistentibus, bracteis evanescentibus.

HAB. Chikushizan; Nankō, Dainan-ō, Soseikyaku, Shakkō.

**Alpinia speciosa** K. SCHUMANN; HAYATA Ic. Pl. Formos. V. p. 227; Gen. Ind. p. 82.

HAB. Shōkei, Busegan, Seisui, leg. B. HAYATA, Mai. 1917.

NOTE: Plant 2-3 m. tall; spikes somewhat nodding; lip yellow at the margin, red towards the center.

**Alpinia suishaensis** HAYATA sp. nov.

*Alpinia* sp. HAYATA Ic. Pl. Formos. V. p. 217.

HAB. Suisha, Holisha, Musha.

Differs from *A. kelungensis*, in the much narrower leaves and in the labellum with two lobes at the apex.

NOTE: Fruits scarlet-red; much smaller than those of *A. kelungensis*.

**Alpinia tonrokuensis** HAYATA sp. nov. Caulis 2-3 m. altus. Folia superiora subsessilia, ligulis 2-lobatis 8 mm. longis extus villosis intus glabris obtusis, laminis lanceolatis 55 cm. longis 10 cm. latis apice subito acuminatis ad caudam linearem 2 cm. longam 2 mm. latam abeuntibus margine integerrimis ad marginem hirsutis utraque pagina glabris basi acutis. Spicæ erectæ cylindricæ dense floriferæ 20-25 cm. longæ, floribus fere sessilibus; rhachis

dense fulvo-villosa; bracteis conchiformibus chartaceo-membranaceis 3 mm. longis in explicato 3 cm. latis apice subrotundatis plus minus mucronatis; floribus sessilibus; ovarium 3 mm. longum totiusque latum dense villosotomentosum; calyx 2 cm. longus extus deorsum plus minus hirsutus sursum glaber cylindrico-obconicus intus glaber apice obtusissimus latere uno ad medium fissus; petala 3 obovata 4-5 cm. longa basi attenuata a basi usque ad 1 cm. altitudinem connata apice obtusissima 13 mm. lata; labellum basi cum petali tubo connatum, parte libera ovato-rhomboidea 3-4 cm. longa  $2\frac{1}{2}$  cm. lata apice caudato-triangulari acuta ad summum breve 2-lobata margine subintegra utraque glabra basi latissime acuta margine flava versus medium centralem rubescenti, basi ad faucem dense hirsuta staminodiis minutis utroque latere instructa; stamen erectum vel recurvum, anthera linearis  $1\frac{1}{2}$  mm. longa utroque latere alato; connectivo membranaceo latiore in explicato 6 mm. lato apice obtuso 2-lobato hirsuto, intus medio 2-loculifero; stylo subglabro vel plus minus hirsuto, stigmate infundibuliformi hirsuto.

HAB. Kussaku, leg. B. HAYATA, Mai. 1916.

Near *A. formosana* SCHUM.; but differs from it in the densely tomentose ovary and in the labellum nearly cuspidate at the apex; also very near *Alpinia kussakuensis*; but distinguishable from it by the lips which are shortly 2-lobed at the tip, in the thinner hirsute connectives, and in the smaller anthers.

NOTE: Plant 2-3 m. tall; bracts and sepals pink; corolla white; lip yellow at the margin, but yellow-red towards the center; anthers narrower than those of *Alpinia uraiensis* HAY.

***Alpinia uraiensis*** HAYATA Ic. Pl. Formos. V. p. 224; Gen. Ind. p. 82.

HAB. Urai, Tonroku, Kaukaukei, Suisha.

NOTE: Bracts reddish-purple at the tip; calyx nearly white; lip yellow, reddish at the center; anthers very thick; fruits light scarlet.

## Liliaceæ.

***Pseudosmilax*** HAYATA g. n.

Flores dioecii. Fl. ♂: perianthium gamophyllum apice brevissime 3-

lobatum. Stamina 9 fere distincta. Flores ♀ ignoti. Herba scandentissima, foliis cirrhiferis. Species duæ in Formosa incolæ.

Just intermediate between *Smilax* and *Heterosmilax*. The new genus resembles *Smilax* in having nearly distinct stamens; but differs from the latter in the gamophyllous perianth. It is also allied to *Heterosmilax* in the gamophyllous perianth, but distinguishable from the latter in the nearly distinct stamens which amount as many as nine.

**Pseudosmilax seisuiensis** HAYATA sp. nov. (Pl. VI.) Caulis teres scandentissimus glaberrimus stramineus (in exsiccato). Folia alterna chartacea vel tenuiter coriacea ovata 7–11 cm. longa 4–7 cm. lata apice triangulari-acuta ad summum brevissime apiculata basi late truncata cordata vel rotundata margine integra 5-nervia, nervis ad apicem convergentibus, venulis reticulatis, nervis venis venulisque utraque pagine distincte elevatis, petiolis 1–3 cm. longis prope basin utroque latere cirrhiferis, cirrhis filiformibus circ. 10 cm. longis volubilibus. Flores umbellati, umbellis 50–60-floratis longe pedunculatis, pedunculis 5 cm. longis complanatis, pedicellis  $1\frac{1}{2}$ –2 cm. longis glabris basi bracteolis minutis digitiformibus instructis. Perianthium glabrum obovatum vel oblongum gamophyllum 3 mm. longum 2 mm. latum apice ore minute 3-lobatum. Stamina 9 fere distincta fere contracta, filamentis 1 mm. longis, antheris linearibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis apice acuminatis apiculatis adnatis introrsum dehiscentibus. Rudimentum ovarii nullum. Flores ♀ ignoti.

HAB. Inter Seisui et Gūukutsu, leg. B. HAYATA et S. SASAKI, Mai. 1917.

Near *Heterosmilax* in the gamophyllous perianth; but differs from it in having as many as nine stamens with nearly distinct filaments, and much longer linear anthers. In *Heterosmilax*, stamens are usually three, and have nearly connate filaments and very much shorter reniformed anthers.

**Pseudosmilax hogoensis** HAYATA sp. nov. Caulis scandentissimus trigonus 6–7 mm. in diametro sectionis glaber. Folia alterna adulta magna ovato-cordata 25 cm. longa 18 cm. lata apice acuta basi cordata 5-nervia, folia juvenia ovato-oblonga 18 cm. longa 8 cm. lata apice acuminata basi rotundata obtusa chartacea vel membranacea margine integra, petiolis 3 cm. longis prope basin utroque latere cirrhiferis, cirrhis 2–5 cm. longis volubilibus. Flores umbellati, umbellis 40–50-floratis longe pedunculatis, pedunculis 6 cm. longis



valde complanatis, pedicellis 1 cm. longis basi bracteis et bracteolis minutis instructis. Perianthium obovoideum vel oblongum 3 mm. longum 2 mm. latum apice brevissime 3-lobatum. Stamina 9 fere distincta, filamentis 1 mm. longis, antheris linearibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice obtusis adnatis. Ovarium nullum. Fl. ♀ ignotus.

HAB. Hōgō, ad 4,000 ped. alt. leg. B. HAYATA, Aprili. 1916.

Near *Pseudosmilax seisuiensis* HAY.; but distinguishable from it in the much more elongate leaves of thinner texture.

### *Smilax* LINN.

#### *Key to species.*

1. Stem erect; leaves small ..... 2.
- Stem scandent or climbing ..... 4.
2. Petiole base vaginate without tendrils ..... *S. tenuissima*.
- Petiole base not vaginate, tendrils more or less distinct ..... 3.
3. Tendrils short or nearly none ..... *S. gracillima*.
- Tendrils long ..... *S. randaiensis*.
4. Stem armed and very much scabrous or warty ..... *S. trachyclada*.
- Stem armed or unarmed, but neither scabrous nor warty ..... 5.
5. Stem conspicuously armed ..... 6.
- Stem not or slightly armed ..... 9.
6. Stem densely beset with long soft spines ..... *S. horridiramula*.
- Stem remotely beset with short stiff spines ..... 7.
7. Leaves herbaceous ..... *S. formosana*.
- Leaves coriaceous ..... 8.
8. Leaves linear ..... *S. elongato-reticulata*.
- Leaves oblong ..... *S. elongato-umbellata*.
9. Adult leaves herbaceous ..... 10.
- Adult leaves chartaceous or coriaceous ..... 11.
10. Leaves ovato-lanceolate or linear ..... *S. herbacea* var. *daibuensis*.
- Leaves cordately rounded ..... *S. ovato-rotunda*.
11. Petiole base auricled ..... *S. prolifera*.
- Petiole base not auricled ..... 12.

12. Leaves nervo-marginate ..... *S. nervo-marginata*.  
 Leaves not nerved at the margin ..... 13.
13. Leaves lanceolate or ovate-lanceolate ..... 14.  
 Leaves ovate or ovate-rounded ..... 15.
14. Peduncles very short or nearly sessile, leaves 3-nerved ..... *S. glabra*.  
 Peduncles long .. *S. lanceifolia*, *S. liukiensis*, *S. takaoensis*, *S. arisanensis*.
15. Leaves larger ..... 16.  
 Leaves smaller ..... 17.
16. Petiole base longer and distinctly winged; leaf base acute.. *S. taiheiensis*.  
 Petiole base shorter and nearly wingless; leaf base rounded *S. stenopetala*.
17. Quite unarmed ..... *S. planipedunculata*.  
 More or less armed ..... *S. China*.

**Smilax arisanensis** HAYATA (Fig. 42, 1-6) Mater. Fl. Formos. p. 356.

Descriptio aucta: Fl. umbellati; perianthii segmenta 6, exteriora majora oblonga 4 mm. longa  $1\frac{1}{2}$  mm. lata, interiora minora oblongo-linearia  $3\frac{1}{2}$  mm. longa 1 mm. lata apice obtusa; stamina 6, filamentis  $1\frac{1}{2}$  mm. longis, antheris oblongo-rotundatis  $\frac{1}{3}$ - $\frac{1}{2}$  mm. longis.

HAB. Arisan.

**Smilax elongato-reticulata** HAYATA (Fig. 43, 7-14) Mater. Fl. Formos.

p. 357. Descriptio aucta: Flores ♂ umbellati, pedicellis 7 mm. longis; rhachis umbellarum elongata 2 mm. longa  $\frac{2}{3}$  mm. lata, bracteis minutis oblongis  $\frac{1}{2}$  mm. longis obtusis; pedunculi umbellarum 1 cm. longi solitarii axillares. Perianthii segmenta 6, exteriora oblonga  $4\frac{1}{2}$  mm. longa 2 mm. lata apice obtusa, interiora lineari-spathulata 4 mm. longa 1 mm. lata apice obtusa. Stamina 6, filamentis basi usque ad 1 mm. cum segmentis perianthii connatis, partibus liberis  $1\frac{1}{2}$  mm. longis, antheris oblongo-ovatis 1 mm. longis apice acutis. Ovarii rudimentum 0. Bacca late globosa nigricans 7 mm. longa totiusque lata 2-3-sperma. Semina purpureo-rubescens levissima 4 mm. longa  $3\frac{1}{2}$  mm. lata oblongo-globosa plano-convexa.

HAB. Tatsutaka, Oiwake, ad 7,500 ped. alt., leg. B. HAYATA, Aprili. 1916.

NOTE: Fruits dark purple glaucous; perianth pale green; ovary green; anthers pale yellow.

**Smilax formosana** HAYATA sp. nov. (Fig. 43, 1-6). *Smilax Sieboldi*

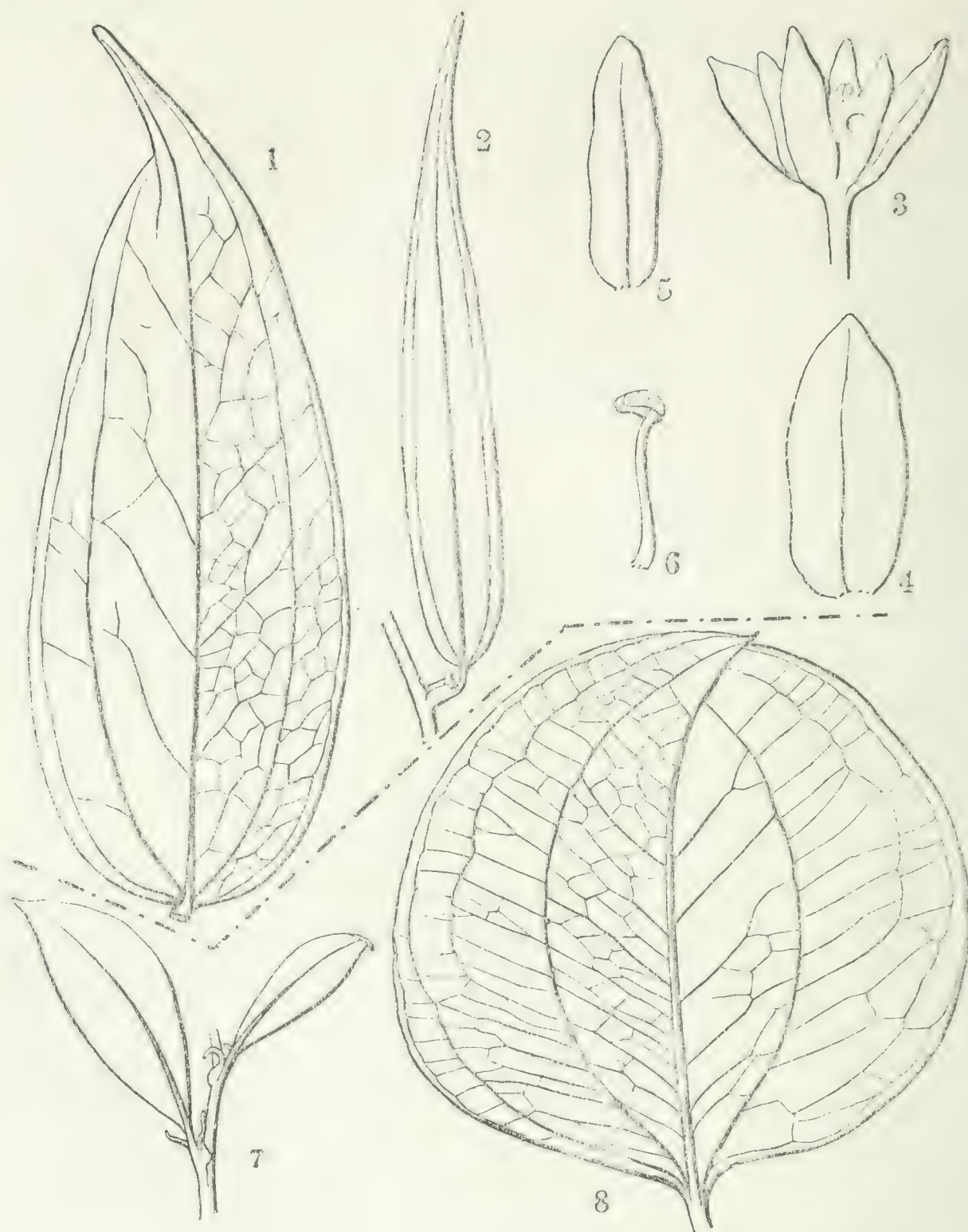


Fig. 42; 1-6, *Smilax arisanensis* HAYATA; 1, 2, different forms of leaves; 3, a male flower; 4, an outer segment; 5, an inner segment; 6, a stamen; 7-8, *Smilax China* LINN.; 7-8, young and adult leaves.



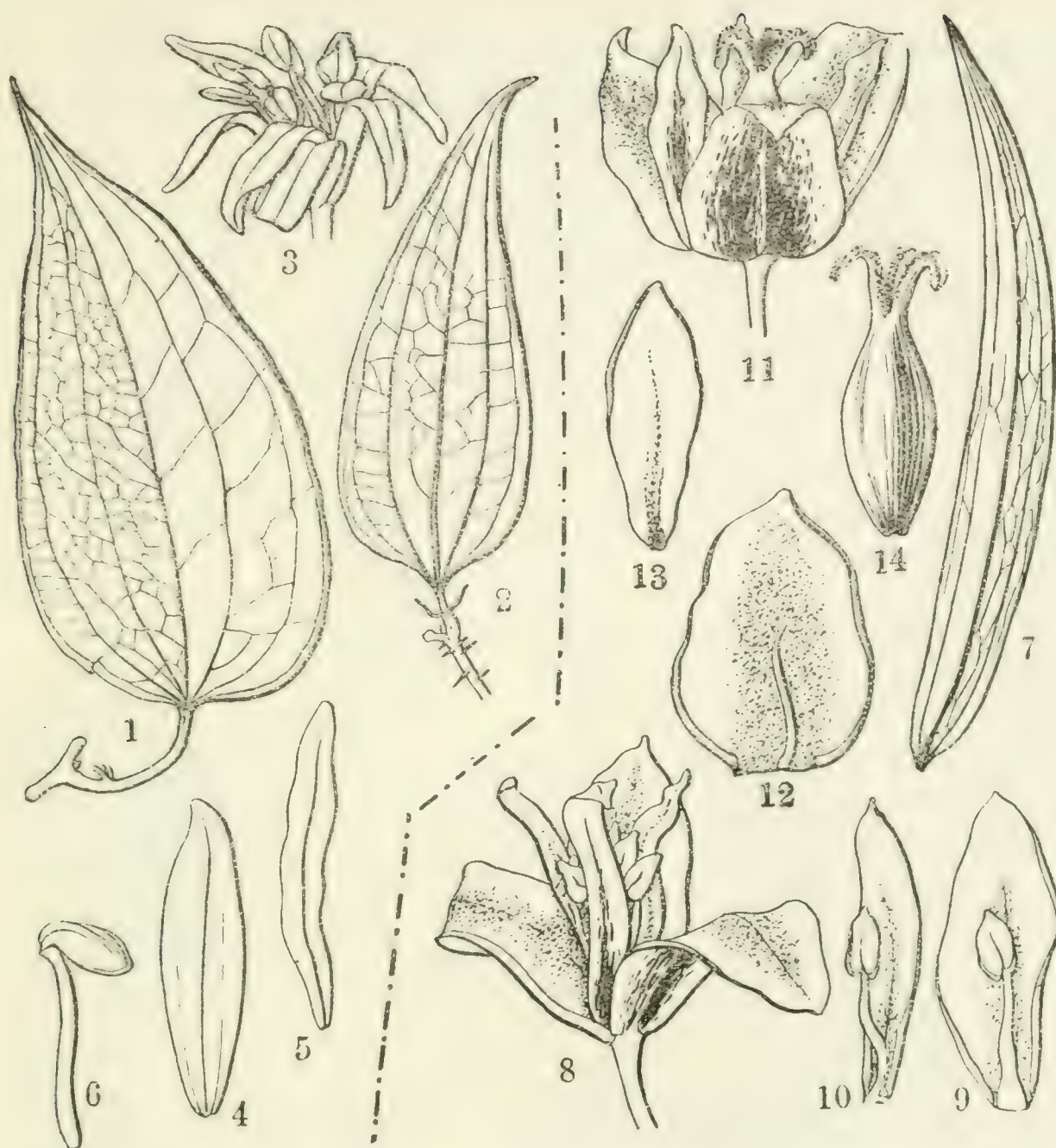


Fig. 43; 1-6, *Smilax formosana* HAYATA; 1, 2, different forms of leaves; 3, a male flower; 4, an outer segment; 5, an inner segment; 6, a stamen; 7-14, *Smilax el ngato-reticulata* HAYATA; 7, a leaf; 8, a male flower; 9, an outer segment of the same flower; 10, an inner segment of the same; 11, a female flower; 12, an outer segment of the same flower; 13, an inner segment of the same; 14, an ovary.

MIQ. var. *formosana* HAYATA Mater. Fl. Formos. p. 363. Descriptio aucta: Pedunculi axillares solitarii apice flores umbellatim gerentes 2-2½ cm. longi apice rotundato-plani laud bracteati, pedicellis 7 mm. longis. Perianthii segmenta 6, exteriora 3 oblongo-lineararia 4½ mm. longa 1½ mm. lata apice obtusa,

interiora linearia 1 mm. lata apice obtusa. Stamina 6, filamentis 2-2½ mm. longis, antheris obovato-oblongis 1½ mm. longis. Rudimentum ovarii 0.

*Smilax elongato-umbellata* HAYATA (Fig. 44) Mater. Fl. Formos. p.

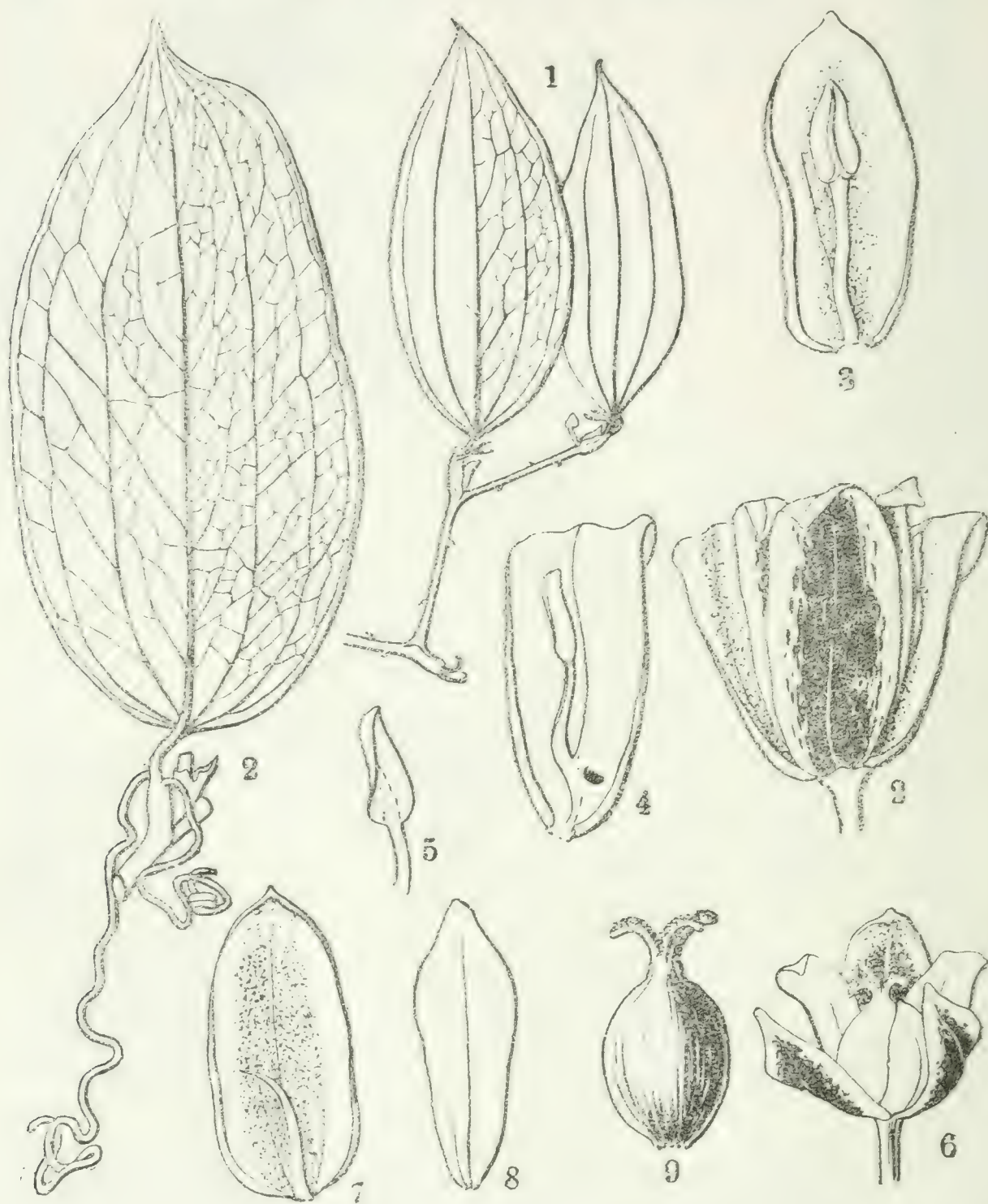


Fig. 44; *Smilax elongato-umbellata* HAYATA; 1, 2, young and adult leaves; 2, a male flower; 3, 4, segments of the same flower; 5, a stamen; 6, a female flower; 7, an outer segment of the female one; 8, an inner segment of the same; 9, an ovary.



358. Descriptio aucta: Folia adulta oblonga 9 cm. longa  $4\frac{1}{2}$  cm. lata apice breve acuta vel subito acuminata basi rotundata margine integra coriacea 5-nervia, petiolis  $1\frac{1}{2}$  cm. longis a basi usque ad 1 cm. dilatis late alatis, utroque latere cirrhiferis, cirrhis 7-8 cm. longis. Flores ♀ umbellati, pedicellis 6-7 mm. longis basi bracteatis, bracteis triangulari-lanceolatis 1 mm. longis acuminatis. Perianthii segmenta 6, exteriora majora ovato-oblonga 3 mm. longa 2 mm. lata apice obtusissima margine anguste plicata, interiora oblongo-linearia 3 mm. longa 1 mm. lata apice obtusa. Staminodia linearia cum segmentis partim connata. Ovarium conico-ovoideum  $1\frac{1}{2}$  mm. longum 1 mm. latum apice obtusum, stigmate sessili 3-partito, partibus linearibus  $\frac{1}{2}$  mm. longis deorsum recurvis.

HAB. Hakku, ad 4,000 ped. alt., leg. B. HAYATA, Aprili. 1916; Musha, leg. S. FUJII.

NOTE: Perianth-segments reddish, ovary pale green.

**Smilax gracillima** HAYATA (Fig. 45, 2-3) Mater. Fl. Formos. p. 357; Gen. Ind. p. 85.

**Smilax herbacea** LINN. var. **daibuensis** HAYATA n. v. (Fig. 45, -4). Scandentissima glabra. Folia alterna membranacea vel chartacea ovato-lanceolata vel lanceolata 10-16 cm. longa  $2\frac{1}{2}$ - $6\frac{1}{2}$  cm. lata apice subito acuminata vel caudata ad summum aristis brevibus instructa basi rotunda truncata vel tenuiter cordata margine crenulato-erosa, costis nervis venulisque supra tenuissime subtus prominente elevatis, 5-7-nervia pellucida, petiolis 1-3 cm. longis prope basin utroque latere cirrhiferis, cirrhis filiformibus 5-7 cm. longis. Flores umbellati, umbellis longe pedunculatis, pedunculis axillaribus 8-10 cm. longis haud vel vix complanatis, pedicellis 2 cm. longis, bracteis scariosis oblongo-triangularibus  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis; apice pedunculi globoso  $2\frac{1}{2}$  mm. in diametro. Perianthii segmenta 6, exteriora majora 9 mm. longa  $1\frac{1}{2}$  mm. lata, interiora angustiora linearia 1 mm. lata apice obtusa. Stamina 6, filamentis linearibus 5 mm. longis, antheris linearibus  $2\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice acutis vel obtusis. Rudimentum ovarii 0.

HAB. Daibusan, leg. MATSUDA (No. 264).

Differs from the type in having ovately lanceolate leaves.

**Smilax horridiramula** HAYATA sp. nov. (Fig. 46). Scandens; caulis



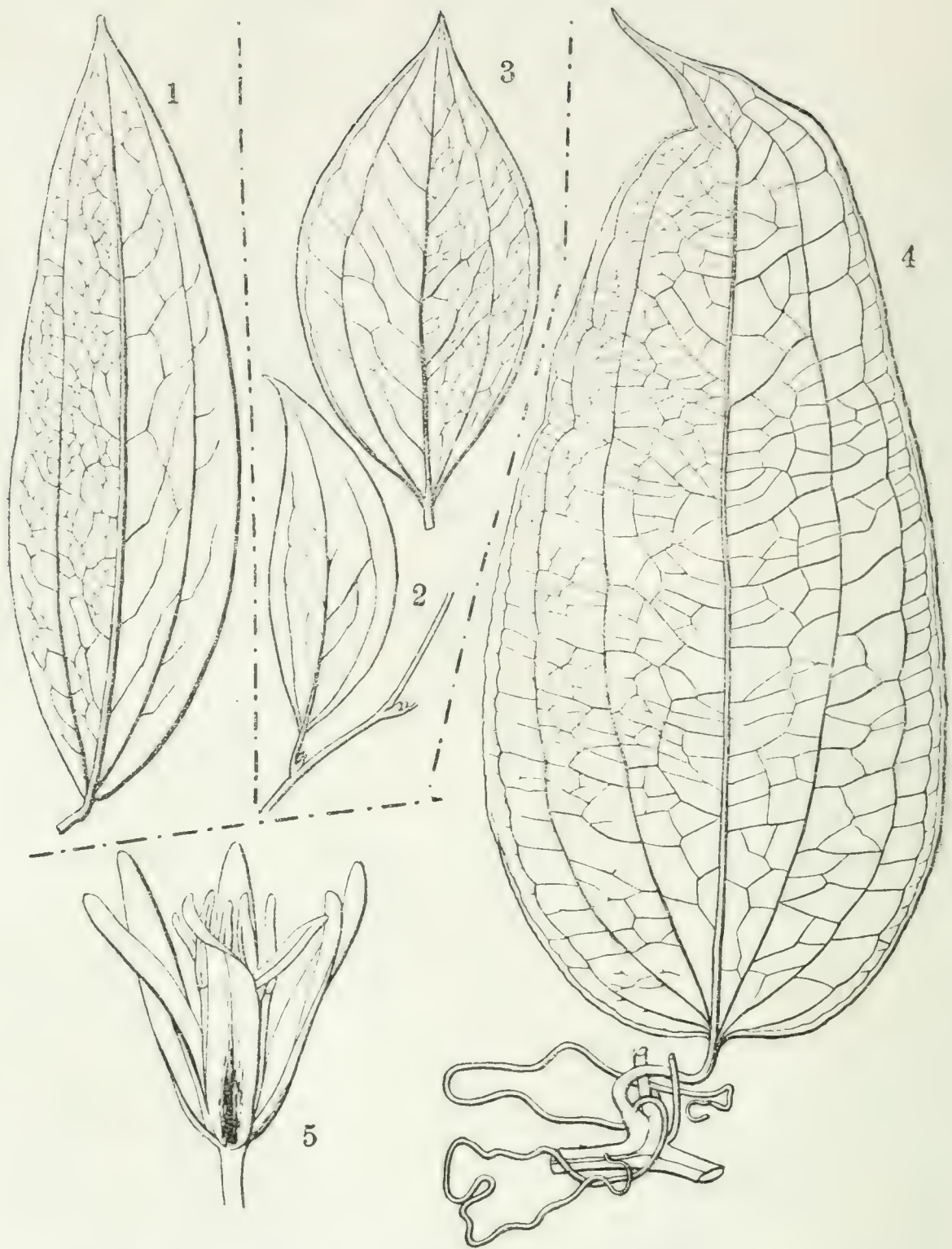
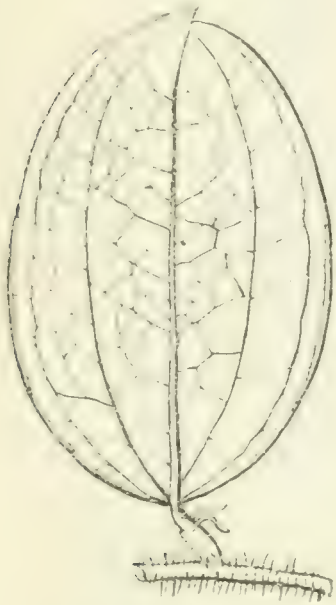


Fig. 45; 1, a leaf of *Smilax glabra* Roxb.; 2, 3, different forms of leaves of *Smilax gracillima* Hayata; 4, a leaf of *Smilax herbacea* var. *daibuensis* Hayata; 5, a flower of the same variety.

teres flexuosus dense spinulosus, spinulis patentissimis gracillimis tenuibus 5 mm. longis, ramosissimus. Folia alterna oblonga vel oblongo-ovata  $5\frac{1}{2}$  cm.

longa 3-3½ cm. lata apice obtusissima ad summum brevè cuspidata basi rotundata chartacea margine integra 5-nervia utraque pagine glabra, nervis supra minus subtus plus prominente elevatis venis venulisque utraque pagine



tenuissime elevatis, petiolis 1 cm. longis sursum angustis deorsum dilatis, partibus angustis 2 mm. longis, partibus dilatis 7-8 mm. longis alatis apice cirriferis, cirrhis brevissimis 2-3 mm. longis. Flores umbellati, umbellis ad axillas foliorum infimorum ramulorum lateralium solitariis, pedunculis 3 cm. longis complanatis aculeatis. Ramuli laterales basi squamis 2 instructi, squamis oblongo-triangularibus 1-1½ cm. longis apice acutis crassiusculis. Fructus globosus 6 mm. in diametro 2-spermus. Semina purpureo-rubescencia oblonga 3 mm. longa 2½ mm. lata apice truncata plano-convexa.

Fig. 46; *Smilax horridiramula* HAYATA.

HAB. Akō : Kasagiyama ; Paiwan ; Takao, leg. Y. MATSUDA.

Near *Smilax ferox* WALL.; but differs from it in the branches and branchlets which are densely covered with rather slender long spines.

***Smilax ovato-rotunda*** HAYATA sp. nov. (Fig. 48-2). Scandentissima; caulis teres lævis. Folia alterna ovato-rotunda membranacea vel tenuiter coriacea 8-9 cm. longa 6-7 cm. lata apice subito acuta basi rotundata vel tenuiter cordata margine integra 5-7-nervia, nervis venisque supra minus subtus plus elevatis, utraque pagine glabra, petiolis 1-2 cm. longis prope basin cirriferis, cirrhis filiformibus. Pedunculæ 2 cm. longæ valde complanatae fructus 5-7 umbellatim gerentes, pedicellis 2-2½ cm. longis; apice pedunculi globoso, bracteis triangularibus 1 mm. longis. Bacca globosa 7-8 mm. in diametro glabra 1-3-sperma. Semina rubescencia globosa vel semi-globosa vel triquetro-globosa 4 mm. longa.

*Smilax Oldhami* HAYATA Gen. Ind. p. 86, (non MIQ.)

HAB. Arisan : Inter Heishana et Jūjiro, leg. B. HAYATA, Aprili. 1912.

Near *S. Oldhami*; but differs from it in the long scandent branches of much robust habit.



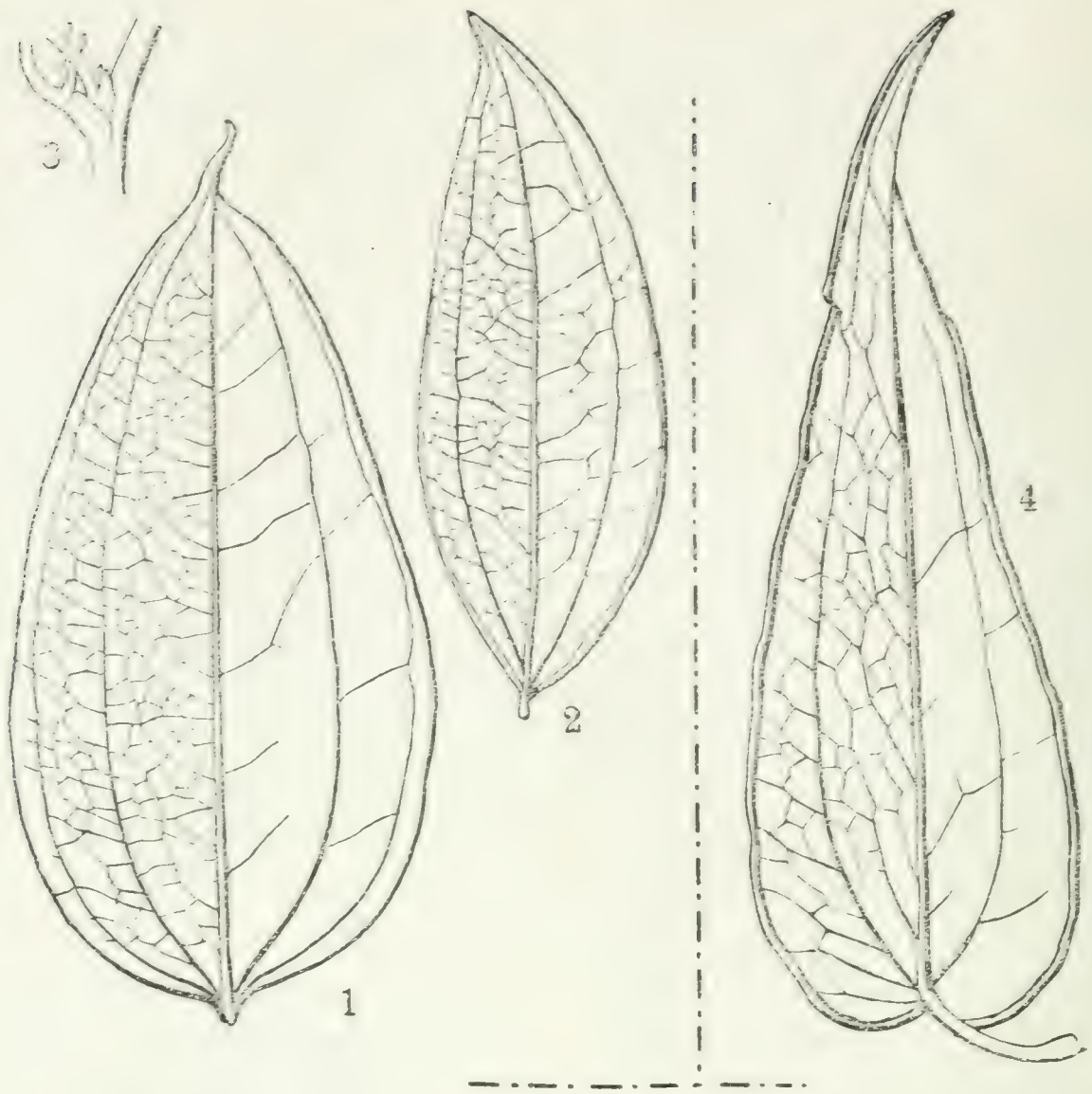


Fig. 47; 1-3, *Smilax lanceafolia* ROXB.; 1, 2, different forms of the leaves; 3, stipules; 4, a leaf of *Smilax nervomarginata* HAYATA.

***Smilax taiheiensis* HAYATA** sp. nov. Scandentissima. Folia coriacea oblongo-rotundata 10 cm. longa 7 cm. lata apice cuspidato-acuta basi subito acuta ad petiolum abeuntia margine integra 5-nervia, nervis venisque utraque pagine distincte elevatis, utraque pagine glabra, petiolis 2-1½ cm. longis angustissime alatis basi dilatis, partibus dilatis 1-1½ cm. longis alatis apice cirrhiferis. Flores umbellati, pedunculis axillaribus 2½ cm. longis complanatis, pedicellis 5 mm. longis, bracteis late triangularibus 1 mm. longis. Perianthii segmenta 6, exteriora majora oblonga 4 mm. longa 2 mm. lata apice acuta; interiora 3½ mm. longa 1½ mm. lata apice obtusa. Staminodia 6.



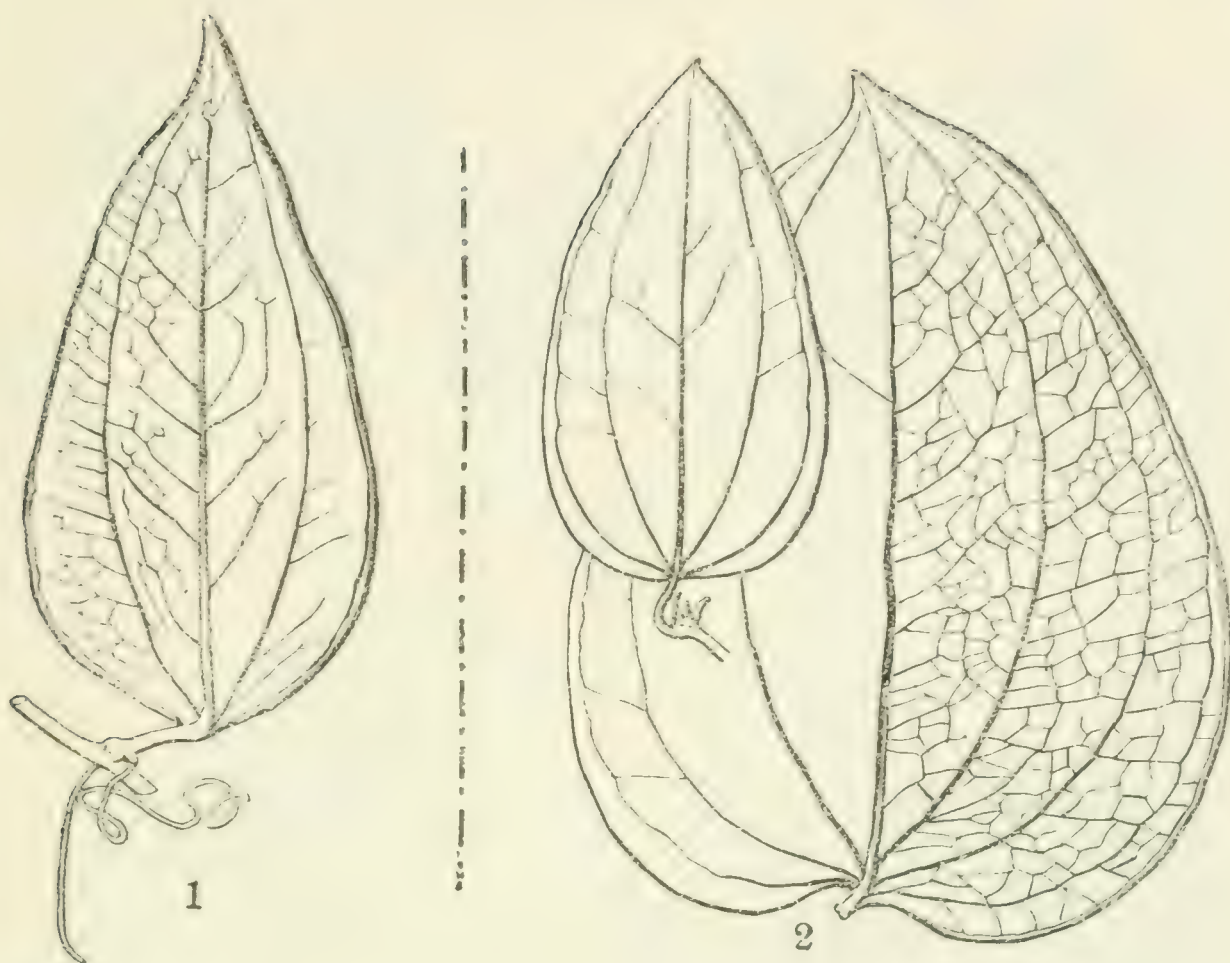


Fig. 48; 1, *Smilax liukiensis* HAYATA; 2, *Smilax ovato-rotunda* HAYATA.

linearia  $1\frac{1}{2}$  mm. longa. Ovarium ovoideum 2 mm. longum  $1\frac{1}{2}$  mm. latum, stigmate sessili 3-partito, partibus linearibus valde deorsum recurvis  $1\frac{1}{2}$  mm. longis.

HAB. Taiheizan, leg. B. HAYATA et S. SASAKI, Mai. 1917.

Near *S. stenopetala*, but differs from it in the broad winged petioles, in the leaf-blades with much acuter base, and in the simply umbellate flowers. In *S. stenopetala*, umbels are arranged in a cyme.

***Smilax takacensis*** HAYATA sp. nov. Scandentissima; caulis teres scaberulus. Folia alterna elongato-oblongo-ovata chartacea 8–9 cm. longa  $3\frac{1}{2}$  cm. lata apice obtusa ad summum breve acuta vel breve caudato-acuta basi obtusa rotundata margine subintegra glabra 5-nervia, nervis venisque utraque pagine tenuissime elevatis, petiolis 1–2 cm. longis prope basin cirrhiferis, cirrhis filiformibus 5–7 cm. longis. Pedunculæ axillares 5 cm. longæ apice flores

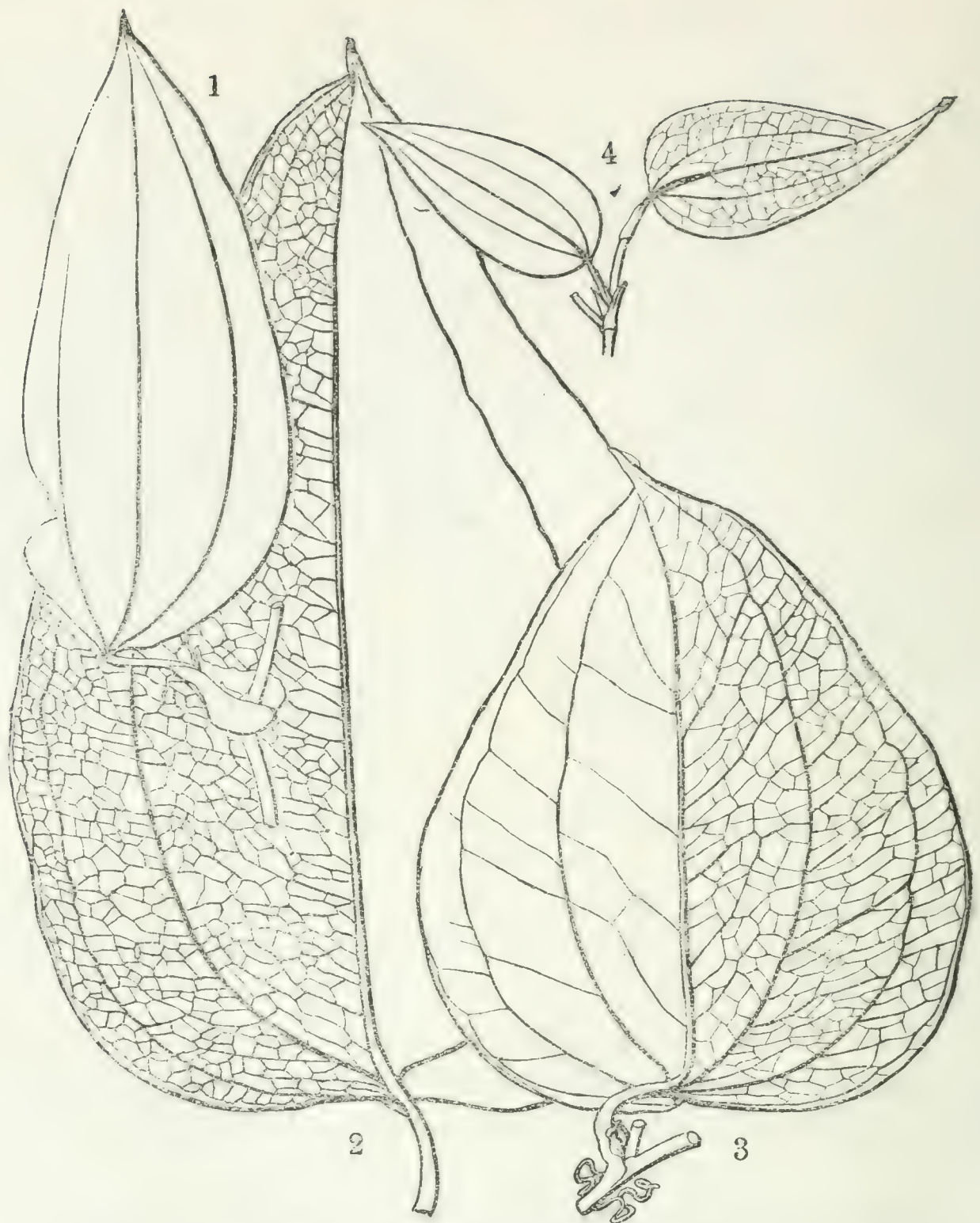


Fig. 49; 1, 2, different forms of *Smilax prolifera* ROXB.; 3, *Smilax planipedunculata* HAYATA; 4, *Smilax randaiensis* HAYATA.

umbellatim gerentes, pedicellis  $2\frac{1}{2}$  cm. longis, basi bracteis triangularibus instructis; apice pedunculi globoso. Bacca globosa. Semina rubescentia.

HAB. Takao, leg. U. FAURIE, Januario, 1914, No. 302.



Near *S. glabra* ROXB.; but differs from it in the much longer peduncles and pedicels.

***Smilax tenuissima* HAYATA** sp. nov. (Fig. 50,-2.) Caulis erectus vel scandens ramosissimus, ramis ramulisque teretibus glabris lævibus ad locum ramificationis vaginis foliorum persistentibus obtectis gracilibus ascendentibus. Folia alterna oblongo-ovata 3 cm. longa 10-12 mm. lata apice obtusa ad summum breve aristata basi obtusa margine integra 3-nervia, costis venisque utraque pagine tenuissime elevatis, petiolis 1 cm. longis haud cirrhiferis basi dilatis vaginiformibus caulem amplexantibus. Pedunculæ axillares  $1\frac{1}{2}$  cm. longæ fructus 2-3 umbellatim gerentes, pedicellis 5 mm. longis basi bracteatis, bracteis ovato-linearibus 3 mm. longis  $\frac{1}{2}$  mm. latis acuminatis. Bacca late globosa 5 mm. lata 4 mm. longa. Semina .....

HAB. Mt. Morrison, ad 7,000 ped. alt., leg. S. SASAKI, Oct. 1919.

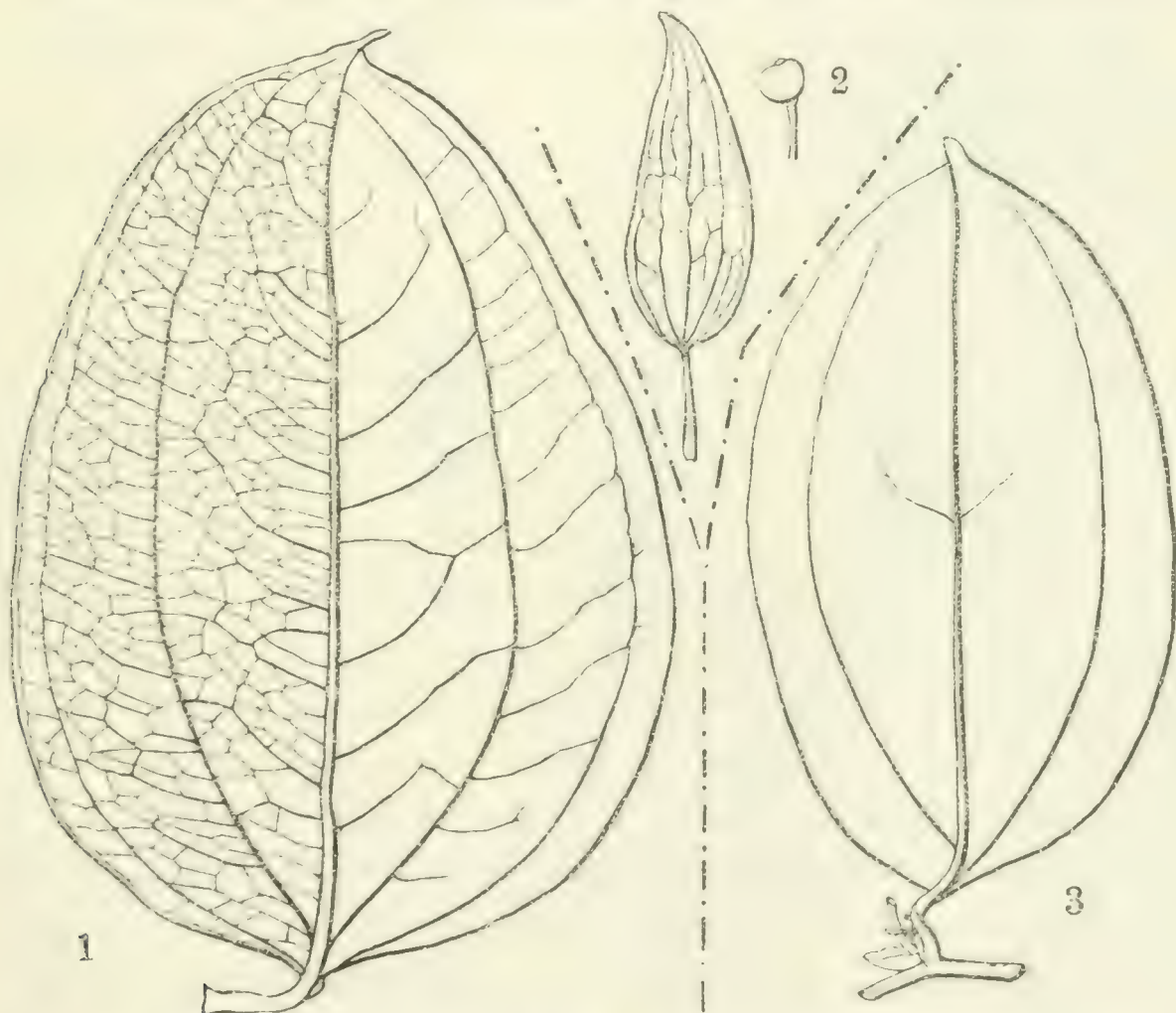


Fig. 50; 1, *Smilax stenopetala* A. GR.; 2, *Smilax tenuissima* HAYATA; 3, *Smilax trachyclada* HAYATA.



Near *S. gracillima* HAYATA; but differs from it in the vaginate leaf base.

**Smilax trachyclada** HAYATA sp. nov. (Fig. 50, -3.) Scandentissima; aculeatus scaberrimus, aculeis triangularibus 2-3 mm. longis, ramosissimus. Folia oblongo-ovata 8-10 cm. longa 5-6 cm. lata obtusissima fere rotundata ad summum breve apiculata, apiculis 3 mm. longis, basi rotundata margine integra chartacea 5-nervia, nervis venulis supra minus subtus plus elevatis, petiolis 1-1½ cm. longis basi dilatis, partibus dilatis 5 mm. longis apice cirrhiferis, cirrhis brevioribus 5 mm. longis. Cymæ axillares solitariae, pedunculis 2 cm. longis dichotome et cymose ramosis, ramis divaricatis apice flores 20-30 umbellatim gerentibus, pedicellis 7 mm. longis. Perianthii segmenta 6, exteriora linearia 6 mm. longa 1½ mm. lata apice obtusa, interiora angustiora linearia 6 mm. longa ⅔ mm. lata apice obtusa. Stamina 6, filamentis filiformibus 7 mm. longis, antheris oblongo-linearibus 1½ mm. longis apice obtusissimis.

HAB. Arisan, ad 2,500 m. alt., leg. B. HAYATA, typus; Mt. Chōran; Bangari; Tōseikaku.

Near *S. stenopetala*; but differs from it in the very much scabrous verrucose branchlets.

### *Heterosmilax* KUNTH.

**Heterosmilax raishaensis** HAYATA sp. nov. (Fig. 51.) Suffruticosa, scandentissima; caules et rami graciles angulato-teretes multi-sulcati muricato-rugosi. Folia alterna membranaceo-chartacea vel membranacea ovato-oblonga 12 cm. longa 5½ cm. lata apice acuminata basi rotundata ad extremitatem basilem acuta integra utraque pagine glabra 5-7-nervia, petiolis 2-3 cm. longis basi dilatis, partibus dilatis 7 mm. longis apice utroque latere cirrhiferis, cirrhis filiformibus 5-10 cm. longis. Flores umbellatim dispositi, umbellis 20-40 floratis longe pedunculatis, pedunculis 5-6 cm. longis complanatis apice globose dilatis bracteis bracteolisque florum dense obtectis, bracteis ovatis 1½ mm. longis castaneis, pedicellis florum gracilibus 2½ cm. longis glabris. Perianthium gamophyllum clavato-cylindricum 5 mm. longum 2 mm. latum glabrum apice clausum 3-dentatum, dentibus obtusis minutis ½ mm. latis ¼ mm. longis. Stamina 3, filamentis valde complanatis 2½ mm. longis ½ mm. latis glabris basi usque ad medium connatis, antheris rotundatis ½ mm. in diametro.



Fig. 51; *Heterosmilax raishaensis* HAYATA; 1, a branch; 2, a flower; 3, the same, in vertical section; 4, 5, a stamen, seen from different sides.

apice apiculatis.

HAB. Raisha, leg. Y. MATSUDA.

Near *Heterosmilax arisanensis* HAY., but differs from it in the much more

slender pedicels and in the leaves which are rounded at the base and at the same time always acutely attenuate to the petioles. In *H. arisanensis* the leaves are cordate or rounded at the base but not attenuate to the petioles.

***Polygonatum* ADANS.**

***Polygonatum arisanense* HAYATA** sp. nov. Caulis glaber altissimus circ. 100 cm. longus a medio sursum foliatus. Folia alterna lanceolata inferiora majora 20 cm. longa  $4\frac{1}{2}$  cm. lata apice acuminata basi obtusa ad petiolum 2–3 mm. longum contracta integra membranacea utraque glaberrima subtus plus minus glauca. Flores 2–4 umbellatim dispositi, umbellis axillaribus, pedunculis 1–2 cm. longis gracilibus nutantibus, pedicellis  $1\frac{1}{2}$  cm. longis apice ad locos infra calycem 1 mm. distantes articulatis. Perianthium cylindricum 2 cm. longum 6 mm. latum glabrum apice 6-lobatum, lobis triangularibus 5 mm. longis  $3\frac{1}{2}$  mm. latis apice acutis basi haud contractis. Stamina 6 medio perianthii affixa, filamentis 5 mm. longis, antheris elongato-oblongis 2 mm. longis 1 mm. latis apice apiculatis basi plus minus 2-lobatis. Ovarium ellipsoideum  $5\frac{1}{2}$  mm. longum 3 mm. latum glabrum, stylo filiformi 13 mm. longo glabro, stigmate truncato plus minus dilato.

HAB. Arisan: Kōdenshō, leg. S. SASAKI, Mai. 1913; Bunkiko, ad 1,500 m. alt.

Near *Polygonatum officinale*, but differs from it in having much longer and thinner leaves.

***Polygonatum officinale* ALL. var. *formosanum* HAYATA** n. v. Caulis glaber 80–100 cm. longus ad medio sursum foliatus. Folia alterna elongato-oblonga inferiora majora circ. 10 cm. longa 4 cm. lata apice acuta ad summum obtusa ad petiolum 3–5 mm. longum contracta integra chartacea. Flores 2–4-umbellatim dispositi, umbellis axillaribus solitariis, pedunculis  $1\frac{1}{2}$  cm. longis, pedicellis  $1\frac{1}{2}$  cm. longis, infra apicem articulatis. Perianthium cylindrico-campanulatum 2 cm. longum 8 mm. latum apice 6-lobatum, lobis late triangulari-rotundatis 6 mm. longis 5 mm. latis apice obtusissimis basi plus minus contractis glabris. Stamina 6 ad medium tubi perianthii affixa, filamentis 6 mm. longis glabris, antheris oblongo-linearibus 3 mm. longis 1 mm. latis apice obtusis basi rotundatis. Ovarium ovoideo-fusiforme 5 mm. longum 2 mm. latum



glabrum, stylo 12 mm. longo filiformi, stigmatibus punctiformi.

HAB. Shichiseizan, Tikushizan, Taitonzan.

*Polygonatum officinale* ALL. var. *Maximowiczii* HAYATA Gen. Ind. p. 85, (non FR. et SAV.)

Differs from *P. officinale* var. *Maximowiczii* FR. et SAV. in having much smaller leaves.

### *Smilacina* DESV.

***Smilacina formosana*** HAYATA sp. nov. Rhizoma repens. Caulis erectus 20–30 cm. longus simplex teres sursum plus minus recurvus sursum tenuiter hirsutus deorsum glaber. Folia secus caulem a medio sursum alternatim disposita ovato-oblonga vel oblonga 10 cm. longa 4–5 cm. lata apice acuta vel acuminata ad summum obtusa basi obtusa ad petiolum contracta supra subglabra vel tenuiter hirsuta subtus glabra, petiolis nullis vel usque ad 1½ cm. longis 3–4 mm. latis. Panicula terminalis solitaria 5 cm. longa 4 cm. lata brevis hirsuta, pedunculis 4 cm. longis, pedicellis 2 mm. longis hirsutis, bracteis triangularibus 1 mm. longis. Segmenta perianthii 6 patentia basi plus minus connata obovato-lineariter vel oblonga 3 mm. longa 1½ mm. lata apice obtusa basi plus minus contracta glabra. Stamina 6, filamentis basi cum segmentis perianthii connatis 1½ mm. longis, antheris cordato-reniformibus ½ mm. longis. Ovarium ovoideum 1½ mm. longum totiusque latum glabrum tenuiter 3-lobatum, stylo ½ mm. longo apice stigmatoso, stigmate 3-lobato. Bacca in exsiccato rubescens, rotundata 3-lobata 6 mm. in diametro 3-sperma.

*Smilacina japonica* HAYATA Gen. Ind. p. 85, (non A. GR.)

HAB. Mt. Morrison, Mt. Arisan, Mt. Gōkwanzan.

Near *S. japonica*, but differs from it in the rounded anthers and in the shortly hirsute inflorescence.

### *Paris* LINN.

***Paris arisanensis*** HAYATA sp. nov. Rhizoma crassum repens teres 1 cm. in diametro; caulis erectus basi squamis 2–3 vaginiformibus instructus ex apice rhizomatis oriundus solitarius rectus 30–40 cm. longus glaberrimus apice foliis verticillatis instructus teres. Folia ad apicem caulis verticillatim 8 disposita

lanceolata vel oblanceolata apice acuminata basi obtusa attenuata integra membranacea, petiolis 5 mm. longis. Flores solitarii terminales, pedunculis erectis rectis 7 cm. longis. Sepala 4-5-6 lanceolata  $4-4\frac{1}{2}$  cm. longa 5-10 mm lata apice acuminata basi obtusa vel cuneata margine integra herbacea membranacea. Petala 4-5-6, lineari-filiformia  $5\frac{1}{2}$  cm. longa  $\frac{1}{2}-\frac{2}{3}$  mm. lata sepalo longiora patentia. Stamina 8-12, filamentis glabris 4-5 mm. longis filiformibus, antheris linearibus 7 mm. longis  $\frac{1}{2}$  mm. latis 2-locularibus apiculatis adnatis. Ovarium pentagono-globosum plus minus depressum 5 mm. longum 7 mm. latum, stylo 5-partito, partibus linearibus 4 mm. longis.

*Paris polyphylla* HAYATA Gen. Ind. P. 85, (non SMITH.)

HAB. Ushōkō, leg. B. HAYATA, Aprili. 1916, (typus!); Inter Heishana et Nimandaira, leg. B. HAYATA, Mart. 1912.

Near *Paris polyphylla*, but distinguishable from it in the much thinner and narrower leaves and in the much longer linear petals.

NOTE: Sepals green; petals yellowish green; ovary reddish at the top.

### *Metanarthecium* MAXIM.

*Metanarthecium formosanum* HAYATA sp. nov. Perennis. Folia omnia radicalia lineari-lanceolata 13-15 cm. longa 9 mm. lata apice acuminata basi gradatim angustata glabra integra membranacea. Scapi 20-50 cm. longi erecti recti e centro fasciculi foliorum radicalium oriundi apice spiciformes, partibus spiciformibus viscosis 3-5 cm. longis, bracteis linearibus 5-10 mm. longis 1 mm. latis apice obtusis, pedicellis brevissimis  $1-\frac{1}{2}$  mm. longis. Calyx tubuloso-campanulatus 4 mm. longus 3 mm. latus basi latere superiore gibbosus glaber apice 6-lobatus, lobis oblongo-triangularibus  $1\frac{1}{2}$  mm. longis 1 mm. latis apice obtusis basi haud vel vix contractis; calycis tubus usque ad medium cum ovario connatus. Stamina 6 ore tubi calycis affixa, filamentis brevissimis, antheris subsessilibus ovato-oblongis  $\frac{1}{2}$  mm. longis. Ovarium glabrum semi-inferius, parte libera trigono-conicum 1 mm. longa apice acuta ad stylum  $\frac{1}{2}$  mm. longum abeunti, stylo triquetro apice 3-lobato.

*Metris formosana* HAYATA.

*Metanarthecium foliatum* HAYATA Fl. Mont. Formos. p. 226, (non MAXIM.)

HAB. In Monte Morrison; Monte Randaisan.



Near *M. foliatum* MAXIM.; but differs from it in having much narrower leaves. In examining the flowers of *Metanarthecium* und *Aletis*, I have found no distinction between the two genera regarding the generic characters, as pointed out by Mr. Y. KUDŌ some years ago.

*Aspidistra* KER.

*Aspidistra attenuata* HAYATA (Fig. 52) Ic. Pl. Formos. II. p. 145.



Fig. 52; *Aspidistra attenuata* HAYATA; 1, basal portion of the plant; 2, a flower; 3, the same, in vertical section; 4, a stamen; 5, cross-section of an ovary; 6, vertical section of a pistil; 7, a fruit; 8, cross section of a fruit; 9, a seed; 10, vertical section of the same, embryo seen; 11, an embryo.

*Aspidistra daibuensis* HAYATA sp. nov. Rhizoma repens squamis dense obtectum. Folia secus rhizoma disposita lanceolata 45 cm. longa  $6\frac{1}{2}$  cm. lata apice acuminata vel acuta basi gradatim attenuata chartacea, petiolis 10 cm. longis. Flores secus rhizomata solitariter dispositi, pedunculis 2–3 cm. longis, bracteis 4–5 instructis, bracteis ovatis scariosis apice obtusis vel emarginatis. Perianthium urceolato-campanulatum 2 cm. longum a medio sursum 8-lobatum, lobis anguste triangularibus 1 cm. longis basi 5 mm. longis acuminatis cras-



siusculis intus medio 2-carinatis, carinis 2 mm. latis crassiusculis. Stamina 8, antheris sessilibus tuto perianthii toto adnatis ovatis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice acutis. Ovaria stigmataque ignota.

HAB. Daibusan, leg. Y. MATSUDA, Jan. 1917.

Near *Aspidistra mushaensis* HAYATA, but differs from it in the distinctly carinate lobes of the perianth of the much thicker texture.

**Aspidistra mushaensis** HAYATA sp. nov. Rhizoma repens teres 6 mm. in diametro rhizomatis squamis obtectum. Folia secus rhizomata disposita lineari-ob lanceolata 40 cm. longa 5 cm. lata apice acuta vel acuminata, petiolis 20 cm. longis. Flores rhizomate oriundi solitarii, pedunculis 2 cm. longis basi bracteatis, bracteis scariosis ovato-triangularibus apice acutis vel obtusis multi-seriatim dispositis basin floris amplexantibus. Perianthium albo-roseum late campanulato-bracteatis, latum 1 cm. longum 2 cm. latum medio sursum lobatum, lobis 8 triangularilanceolatis 7–8 mm. longis basi 3 mm. latis acuminatis margine duplicato-plicatis intus secus longitudinem carinatis, intus glabrum. Stamina 8, antheris sessilibus ovatis 2 mm. longis  $1\frac{1}{2}$  mm. latis. Ovarium cylindricum 3 mm. longum 2 mm. latum apice ad stigma expansum, stigmate peltato 6 mm. in diametro valde alteque plicato undulato.

HAB. Musha, ad 3,000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *Aspidistra attenuata* HAY.; but distinguishable from it in the much smaller flowers and leaves and especially in the campanulate perianth.

### *Lilium* LINN.

**Lilium speciosum** THUNB.; HAYATA Gen. Ind. p. 85.

*Lilium Konishii* HAYATA Gen. Ind. p. 85.

### *Heloniopsis* A. GR.

**Heloniopsis acutifolia** HAYATA sp. nov. (Fig. 53). Rhizoma crassum suberectum. Folia omnia radicalia oblanceolata 10 cm. longa  $1\frac{1}{2}$ –2 cm. lata apice acuta ad summum aristis minutis instructa basi longe attenuata usque ad 4 mm. latitudinem abeuntia integra membranacea. Scapi circ. 15 cm. longi erecti recti basi foliis minoribus sursum squamis instructi apice flores 3–5 umbellatim gerentes, pedicellis  $1\frac{1}{2}$  cm. longis. Segmenta perianthii 6 lineari-



Fig. 53; *Heloniopsis acutifolia* HAYATA; 1, the plant; 2, a flower; 3, 4, segments of the perianth; 5, a stamen, seen from different sides; 6, an apical portion of the style; 7, cross-section of an ovary.



lanceolato-spathulata 12 mm. longa 4 mm. lata apice obtusissima basi attenuata. Stamina 6 basi segmentorum affixa, filamentis 1 cm. longis filiformibus glabris, antheris linearibus 3 mm. longis 1 mm. latis apice obtusis basi alte 2-lobatis. Ovarium triangulari-obconicum vel obeordatum 6 mm. longum totiusque latum, stylo 15 mm. longo apice capitato peltato rotundato  $1\frac{1}{2}$  mm. in diametro.

HAB. Bonbonzan, leg. B. HAYATA et S. SASAKI, Mai. 1917.

Near *Heloniopsis umbellata*, but differs from it in the leaves which are triangularly acute and in the much longer anthers.

## Aroideæ.

### *Arisæma* MART.

*Arisæma quinquefoliola* HAYATA sp. nov. (Pl. VII). Caulis cum spadice 40-50 cm. longus basi vaginatus glaber 2-foliatus. Folia dua alterna cum spadice æquilonga pedatim 5-foliolata, foliolo terminali ovato-lanceolato 11-14 cm. longo  $3-3\frac{1}{2}$  cm. lato apice acuto subito longe caudato ad summum arista instructo basi acuto obtuso margine subintegro vel eroso glabro tenuiter membranaceo, petiolulo centrali  $2\frac{1}{2}$  cm. longo glabro, foliolis lateralibus plus minus minoribus conformibus basi plus minus obliquis, petiolulis brevioribus; petiolis communibus 10-12 cm. longis glabris; basi auriculis vaginarum instructis. Spatha cylindrica 8 cm. longa 13 mm. lata glabra, lamina oblonga apice triangulari-acuta vel acuminata medio subito refracto-recurva. Spadix gracilis 7 cm. longus basi deorsum staminifer, partibus staminiferis  $2\frac{1}{2}$  cm. longis; partibus superioribus gracillimis glabris apice breve penicillatis. Stamina secus partem inferiorem spadiceis conspersa, filamentis  $\frac{1}{2}$  mm. longis; loculis antherarum 3-7 secus filamentum spicatim dispositis vel ad apicem filamentorum aggregatis.

HAB. Akō, Kuwarusu, leg. Y. MATSUDA, Jan. 1918; Daibusan, Jan. 1916.

Remarkable for its pedately 5-foliolate leaves.



*Arisæma ringens* THUNB. (Fig. 54); HAYATA Gen. Ind. p. 88.

HAB. Kelung, B. HAYATA, Mart. 1916.

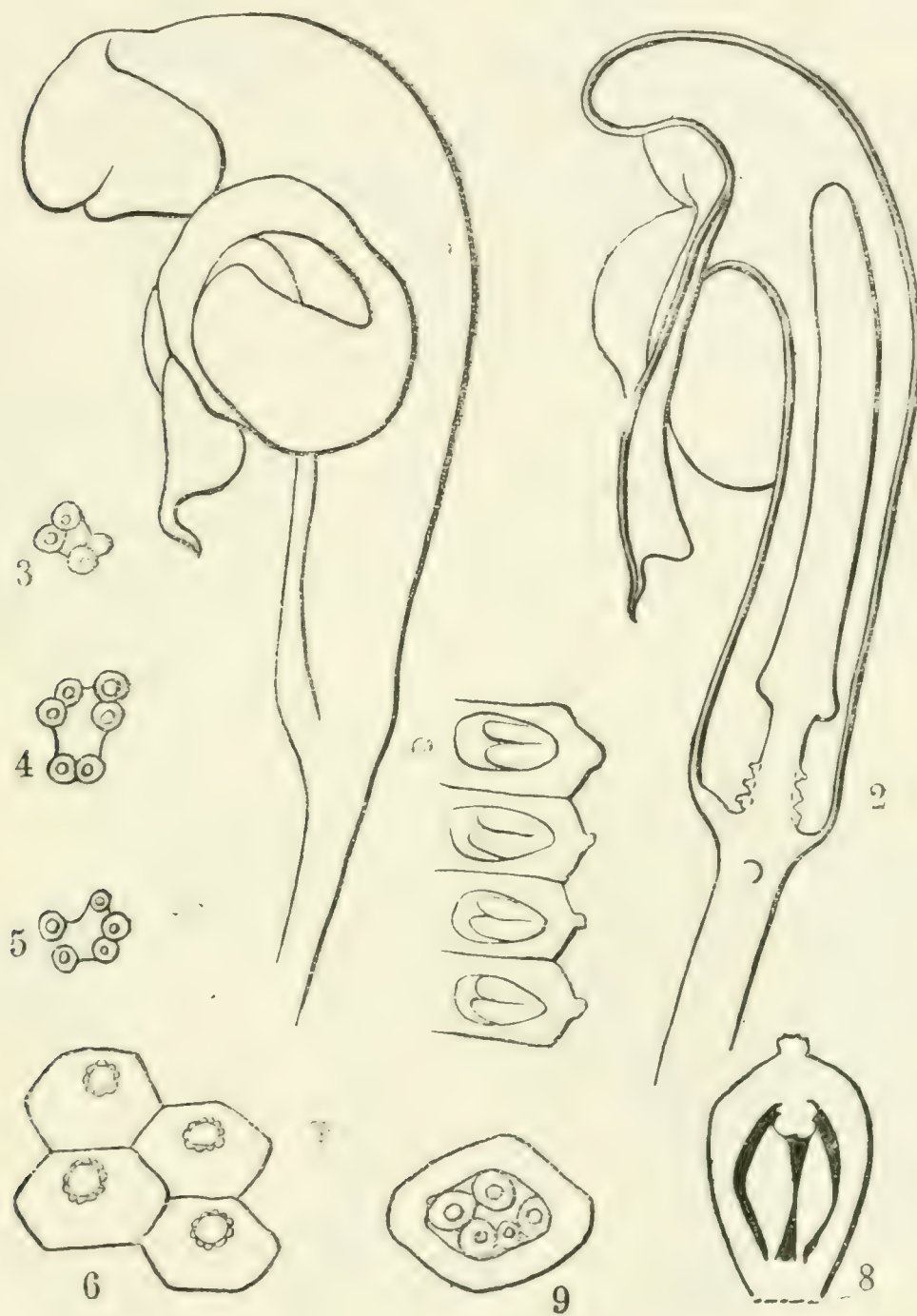


Fig 54; *Arisæma ringens* THUNB.; 1, a spathe; 2, vertical section of the same; 3, 4, 5, stamens; 6, ovaries; 7, vertical section of the same ovaries; 8, vertical section of an ovary; 9, cross-section of the same.



Fig. 53; *Arisaema Matsudai* HAYATA; 1, the plant; 2, a male spadix; 3, a stamen.

**Arisæma Matsudai** HAYATA sp. nov. (Fig. 55). Caulis cum spadice 35-40 cm. longus glaber erectus 1-foliatus. Folia cum spatha æquilonga longe petiolata 3-foliolata, foliolis tenuiter membranaceis, foliolo terminali ovato-oblongo 13 cm. longo 5-6 cm. lato apice acuto ad summum aristato basi acuto vel obtuso margine integro pinninervio, venulis minute reticulatis, subsessili, foliolis lateralibus cum terminali conformibus sed basi obliquis plus minus rotundatis sessilibus, petiolis 10-15 cm. longis deorsum ad vaginam abeuntibus; folia toto glaberrima. Spatha cylindrica cum lamina 7-8 cm. longa, partibus cylindricis 3 cm. longis 1 cm. latis, laminis medio subito refracto-recurvis 3 cm. longis  $1\frac{1}{2}$  cm. latis apice aristato-acuminatis toto glabris. Spadix ♂ græcilis 4 cm. longus basi staminifer, partibus staminiferis  $1\frac{1}{2}$  cm. longis, (staminibus 2-ocularibus, loculis globosis) partibus superioribus filiformibus  $2\frac{1}{2}$  cm. longis aculeis mollis obtusis instructis.

HAB. Kuwarusu, leg. Y. MATSUDA, Aprili. 1917, (T. 645).

Near *A. grapsospadix* HAY.; but, differs from it in the nearly sessile leaflets.

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ICONES PLANTARUM FORMOSANARUM.

IX.

PLATE I.

## Explanation of Plate I.

*Dumasia bicolor* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. A wing.  
4. A keel.  
5. A folded portion of the same keel.  
6. Stamens.  
7. A dehiscing pod.  
8, 9. A seed, seen from different sides.







ICONES PLANTARUM FORMOSANARUM.

IX.

PLATE II.



## Explanation of Plate II.

*Millettia taiwaniana* (MATSUM.)

- Fig. 1. A branch.  
2. A standard.  
3. A wing.  
4. A keel.  
5. Diadelphous stamens.  
6. Ovary.  
7. A pod.



F. Hayami del.

K. Nakazawa sculp.





ICONES PLANTARUM FORMOSANARUM.

IX.

PLATE III.

### Explanation of Plate III.

*Dolichovigna formosana* HAYATA.

- Fig. 1. A branch.  
2. A flower.  
3. A standard.  
4. A wing.  
5. A portion of staminal bundle.  
6. An anther.  
7. Ovary with stamen and calyx.  
8. Pods.  
9. A seed.







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IX.

PLATE IV.

### Explanation of Plate IV.

*Symplocos kiraishiensis* HAYATA.

- Fig. 1. A branch.  
2. A flower.  
3. Corolla with a portion of a staminal bundle.  
4. A stamen, seen from different sides.  
5. Ovary and style.  
6. Apical portion of the ovary and basal portion of the style.  
7. A branchlet with a fruit.  
8. Cross section of a drupe.







ICONES PLANTARUM FORMOSANARUM.

IX.

PLATE V.



### Explanation of Plate V.

*Jasminum Shimadai* HAYATA.

- Fig. 1. The plant.  
2. A corolla-lobe.  
3, 4. A stamen, seen from different sides.  
5. Ovary and style.  
6. Vertical section of the basal portion of the same.







ICONES PLANTARUM FORMOSANARUM.

IX.

PLATE VI.

### Explanation of Plate VI.

*Pseudosmilax seisuensis* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. Vertical section of the same.  
4. Stamens.  
5. A stamen, seen from different sides.







ICONES PLANTARUM FORMOSANARUM.

IX.

PLATE VII.

### Explanation of Plate VII.

*Arisema quinquesfoliola* HAYATA.

- Fig. 1. The plant.  
2. A male spadix.  
3. A stamen.  
4. A female spadix.  
5. An ovary.







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